ALEXANDER HARPER.

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"PIONEERS OF THE PLANTING ENTERPRISE IN CEYLON."

(Second Series.)

ALEXANDER HARPER, J.P.

PLANTER AND MERCHANT:—1849—1889.

THE gentleman, whose portrait we present this month, is not one of whom much can be said; for, although an old and respected Colonist in his day and emphatically a Planting, Pioneer, he was among the most modest and unobtrusive of men, and as a relative has stated to us,—exceedingly reticent about himself. The district with which he was most identified is Matale East, where he came to own as well as manage the Mousakande Estate, before he was induced by Mr. George Wall to become a partner in his firm, and to do much of the work of visiting and inspecting the estates for which the Firm had the Agency.

But to begin at the beginning—and to give the purport of one or two slight sketches of Mr. Harper's career as put before us—we learn that Mr. Harper was born in the Parish of Birse, Aberdeenshire, of very respectable parents, his father being a man who took a firm stand for moral and religious life, at a time when evangelical doctrines and practice in those parts were rather dead. From a lawyer's office in Edinburgh young Harper came out to Messrs. Crowe & Co.,* Colombo—then interested in planting as well as import business,—and was engaged in planting in several places. For some time he was at work in the Galle district opening coffee land, but it turned out unsuitable. After that he was connected with the old "Ceylon Plantations Co.," in Elkadua, and then went into business with George Wall and Captain Jolly, doing generally the Visiting Agent's work when Mr. Wall was in Colombo. Mr. Harper returned to Scotland in 1862, and for four years was Captain of Volunteers, making a most efficient officer; and then in 1869 when his first wife,—daughter of Andrew Cross, Esq., Sheriff Substitute of Perthshire, and a sister of Mr. A. L. Cross, so well-known and respected in Ceylon,—died, the widower returned to Ceylon and resided till 1872 on Mousakanda Estate in Matale East. Illness compelled him in that year to leave for Europe, and he never afterwards returned to the Island. In 1874, he sold his interest in Mousakanda to George Wall & Co., and in that same year, or early in 1875, Mr. Harper married for the second time, his bride being Miss Reid, eldest daughter of the Rev. W. Reid of Banchory-Ternan, Aberdeenshire. By his first marriage, Mr. Harper had one daughter, who became the wife of Dr. Leslie Milne now of Caledon, Cape Colony, son of the Rev. Dr. Milne, Parish Minister of Fyvie, Aberdeenshire; and one daughter and son by his second wife, but the boy died in infancy.

One of the most interesting parts of Mr. Harper's life was his residence and work in Italy. After his second marriage he resided a

* Better known as Messrs. Crowe, Crabbe and Christian in the "forties" until Mr. Christian joined Messrs, J. M. Robertson & Co. and Mr. Crabbe returned to London, when the firm became A. & R. Crowe & Co.—Ed. *T.A.*

few years in Edinburgh, and then in 1879 he and his family went to Rome and passed the winters there till 1884, when Mr. Harper bought a small property "Torre el Praeto" near Florence, and spent the rest of his life there save for occasional visits to Scotland. Mr. Harper was much interested in agriculture in Italy, and began to pay special attention to the cultivation of Olives and Vines; but his health failed, and after a trying illness of five months, he passed away in April 1889.

Physically, Mr. Alexander Harper was one of the many fine strong young men that came from Aberdeenshire in the "forties and fifties." He has told Mr. A. L. Cross that when he first arrived in Ceylon, he could fell forest alongside of the very best Kandyan axemen; and so active did he continue in his habits that when he became a Visiting Agent he would often turn up at estates 20 miles from Kandy, while the Superintendent was preparing to muster his coolies in the early morning.

To the last his interest in Ceylon was warm and deep, though there can be but few in the Island now who can recall the tall manly form of the late Mr. Alexander Harper. One hears a great deal in the present day of Social Brotherhood; but we fancy (from all we have heard—not from himself of course, but from others) of Mr. Harper's good deeds, that there have been few men who made it more their aim to keep the helping hand always outstretched than the late Mr. Alexander Harper:—

'Tis ever wrong to say a good man dies.

Agricultural Pests:

WITH METHODS OF PREVENTION, BY MISS E. A. ORMEROD

(Late Consulting Entomologist to the Royal Agricultural Society of England.)

(*Concluded.*)

VIII.—Liver Fluke, &c.

Slugs are injurious to almost every kind of crop. They belong to the division *Mollusca*. The true slugs may be generally described (when extended or in movement) as being long, more or less spindle-shaped, cylindrical or tumid, head prominent, "tentacles" (commonly known as horus) four in number, and two eyes placed on the tips of the uppermost pair of horns. When at rest or alarmed they draw themselves together into a lump. The field, or milky slug, *L. agrestis*, is a somewhat spindle-shaped kind, about an inch and a third long, grey in colour, and with milky slime, and is very common. The *Arions*, or black slugs, are distinguishable by the skin being wrinkled, and the shield on the back shagreened. *Arion ater* is as much as four inches long. The colour of these two kinds of *Arions* is very variable, and they are stated to lay their eggs seperately under ground.

One very important point to be considered in methods of preventiou is the circumstance that the slug can exude slime, so that it can "moult off," as it were, a coating of lime, or other obnoxious dressing thrown on it, and thus (quite getting rid of it together with the slime) be no worse for one application of any ordinay dressing. This moulting the slug can do a few times successively, but after the operation has been repeated two or three (or at least a very few times), the creature requires an invertal to regain the power; the slime reservoirs, or power of exuding slime, are exhausted for the time being, and the obnoxious dressing consequently takes effect on the skin of the slug and kills it.

Where there is bad slug-attack in fields, attention is particularly needed to these points. On unoccupied land, such a heavy dressing of gas-lime, or quicklime or salt, may he put on, that wherever the slug crawls there is the obnoxious stuff, and it soon loses its slime-producing power and perishes. But very often, where crops are infested lime is only thrown in the middle of the day, or at any convenient time, just when the slugs are sheltered from the dressings falliug on them, and as it soon slacks it does very little towards getting rid of the infestation. I have seen the slug resting as comfortably in the slacked lime as it would under a stone. Or again, if one dressing is given in the morning, or when the slugs are out at feed, it often happens that it is not followed up by another before the slugs can protect themselves. To do good the dressing should be thrown in the evening, when the slugs are at feed, and again the following morning. If the slugs should re-appear next evening, the dressing should be given again; but if it has been properly applied, probably there will be no need.

One or more kinds of the marsh, or water snails play a most seriously injurious part as "hosts" of the liver fluke of sheep, during the early stages of its life. The *Limnæus truncatulus* is the kind which is especially recorded as infested by the fluke in its early stages. Regarding presence of infestation in the *L. pereger*, there has been difference of opinion. These marsh snails wander about, and both kinds are nearly amphihious; they may be found in damp grass as well as in pools.

During the years in which I had personal knowledge of habits of *Limnæus* at Sedbury Park, in West Gloucestershire, *L. pereger* was excessively prevalent in small field ponds or drinking places, where floating water plants, weeds round the bank, and more or less mud, according to weather or season, gave every encouragement to their increase; but we only met with the *truncatulus* in one of these small pools. It would have heen of considerable scientific interest (if we could have had technical examination by an expert) to find whether, in circumstances so congenial to *pereger*, the fluke infestation was perfected in it up to maturity, which it does not appear to reach in this species of snail, as observed in captivity. But, as a coincidence at least (whether of this, or of, great amount of rabbit presence), our sheep were constantly affected by rot to so serious an extent that it was stated by the bailiff he "never killed one with a sound liver." Neither snails nor flukes are connected with insect life, hut this one parasitic attack is given in some degree of detail as an example of the very different successive forms which some of our farm infestations go through, and also of the very different localities in which they are to be found during their progress to maturity.

The following information is abridged from the history of the liver fluke, recorded from his own observations by Prof. A. P. Thomas.—"The liver fluke, *Fasciola hepatica*, lives in livers of various vertebrate animals, and, in this country, especially of sheep, as well as of rabbits and hares; it averages from about au inch to an inch and a quarter iu length, and in shape may be described as not unlike a little sole, iu width about half its length, flat, and largest towards the head end. At the tip of

its head part is placed the mouth, in the middle of small sucker, and at the point where the head joins the flat body, on the lower surface, is another sucker. The colour is pale brown. The eggs, which are brownish and excessively minute, are passed down from the liver to the intestines, and thus distributed with the droppings of the infested animals. If the eggs fall in favourable circumstances for hatching (that is, warm weather on wet and marshy ground, or are washed into ditches or ponds), the embryo within develops in a period which may be of from two or three weeks to two or three months, according to temperature; then the contained embryo pushes off one end of the egg-shell, and swims away with great rapidity and activity. This embryo is described by Prof. A. P. Thomas, in his minutely recorded observations from life of this infestation, as being only about 1-200th of an inch in length , that is, almost too minute to be visible to the naked eye, and in shape not unlike a sugar loaf. In the centre of the largest end is a peg-like projection which is used as a boring tool, and can be withdrawn, or greatly thrust out, at pleasure. The embryo darts and circles about in the water, large and foremost, and if, in the course of its movements, it meets with the water snail (*Limnæus truncatulus*), it at once commences operations. It inserts its borer, and, spinning round and round on itself in the water so as to work the point in like a centre-bit, squeezes its way into the substance of the snail. Here the embryo settles into almost still life, and changes into an oval form, which, when complete, is known as a sporo-cyst, that is, a "cyst," or a bag or bladder, of germs. Within this bag, so to call it, about ten germs develop, known as "rediæ." Each redia as it is developed makes its way out of the sporo-cyst, and being furnished with a mouth and intestine, and two projections that answer the purpose of legs, it feeds on, and makes its way about within, the body of the snail.

Up to this point it will be seen there are four distinct stages of fluke life—the egg: the free swimming embryo; the quiet form of the sporocyst, altering to a mere bag of developing germs: and the germs called rediæ, free from the bag, and feeding on the snail, which ultimately (for the most part) sinks under the parasitic attack. Continuing the history from the same observations, it is shown that in each of these rediæ there form (as in the sporo-cyst before mentioned) a number of germs, but different to these in shape. The germs (the rediæ) that formed in the sporo-cyst are long and narrow, about the sixteenth of an inch in length, and about one-fifth of their length in width; but the germs which form within the rediæ are exceedingly like tadpoles, being oval and flat, and furnished with long slender tails more than twice the length of the body.

These "fluke tadpoles," so to call them, are technically called cercariæ, meaning animals with tails. On the escape of each cercaria from the rediæ in which it was formed, it makes its way from the body of the snail into the water (if in a pond or ditch), but shortly attaches itself to water plants, or whatever may be accessible. There it draws itself up into a round ball, exudes a gummy secretion, wags its tail violently, till at last the appendage, which has now ceased to be useful, is thrown off, and the gummy substance hardening, the cercaria remains within the covering as a little white spot on the plants, or on the locality to which it has attached itself. It is mentioned, however, by Prof. Thomas that "if the infested snails are crawling on the margin of a ditch or over a damp field, the cercariæ, on leaving the snail, at once proceed to form their envelopes or cysts at the bottom of the grass, and so attach themselves to the stalks or leaves near the roots." The next step completes the circle of infestation. When the grass, to which the white speck-like cysts containing the young liver flukes adhere, is eaten by the sheep, or other suitable hosts (as rabbits or hares &c.), the young fluke comes out of the covering, and passes to the liver of its host, increasing in bulk, after being swallowed, from about the eightieth of an inch, to the adult length of an inch or an inch and a third.

Amongst methods of prevention and remedy mentioned by Prof. Thomas are the following:—

Care must be taken to avoid introducing eggs of the fluke either with manure, or with fluke sheep, or in any other way. Rabbits and hares must not be allowed to introduce the eggs.

Dressings of lime, or salt, should be spread over the ground at the proper seasons, to destroy the embryos, the cyst of the fluke, and also the snail, which acts as 'host.'

Sheep must not be allowed to graze closely, for the more closely they graze, the more fluke germs will they pick up.

When sheep are allowed to graze on dangerous ground, they should have a daily allowance of salt, and a little dry food.

Amongst the details of treatment, of which the above is an abstract, is the observation:—"The freedom from rot of sheep feeding on salt marshes is well known, and is now shown to be due to the poisonous action of the salt on the embryos, sporocyst, redia, cercaria, and cyst, and to its similar action on *Limnæus truncatulus* itself. Even a weak solution of salt in water (containing only ⅝ per cent. of salt) proves fatal to this snail.

This principle of prevention would be especially applicable where (as in the instance, before mentioned, in West Gloucestershire) it was the custom to have exceedingly small ponds or cisterns of mason work open to the field on one side and very shallow, and only a few yards square. From the immense quantity of weed or grass growth in or at the edges of these so-called "cattle-drinks," and sometimes the quantity of mud (which is stated to be the especial place of deposit of spawn of the *Limnæus truncatulus*), there was every circumstance that was good for shelter, or propagation, of either *truncatulus* or *preger*; and in circumstances like these a very small outlay on salt would carry destruction with it to the snails and the fluke embryos in the water. Clearing the various vegetable trash, and sprinkling some salt on the mud and into the water, would cost little, and from the details given would, in many cases, strike *in embryo* at infestation which presently, when dispersed over the field, would be far more difficult to deal with.

THE END.

ARECA-NUT CULTIVATION IN INDIA.

IN THANA.

The betel-nut is grown largely in Thana, Bombay. The best nuts are carefully selected in October, and dried in the sun; unhusked nuts are considered best for seed. They are planted in a well-ploughed plot of land in pits three inches wide and three inches deep, and at a distance apart of from six inches to a foot. For the first three months the young palm is watered at least every fourth day, and afterwards every third day. When the plants are a year or a year and-a-half old they are fit for planting out.

The selling price of young plants varies from 6 pies to 1 anna.

The betel palm usually grows in red soil, but it flourishes best in sandy soil that remains moist for sometime after the rains. Before planting the young palm, the ground is ploughed, levelled and weeded, and a water channel is dug six inches deep and a foot and a-half wide. The pits 9 inches deep and two feet wide are dug at least four feet apart, nearly full of earth, but not quite full, so that water may lie in them where the soil allows; plaintains are grown in the beds to shade the young palms. Except during the rainy season, when water is not wanted, the young trees are watered every second day for the first five years and after that every third or fourth day. During the rains the manure is sometimes given.

The cost of betel-nut cultivation in Thana is calculated as follows:—An acre entirely given to betel palms would, it is estimated, hold 1,000 trees. The

total cost of rearing 1,000 betel palms for five years—that is, until they begin to yield—is about £127. 13s., including compound interest at 9 per cent. After five years a thousand trees are estimated to yield about £50 a year, from which, after taking £18 14*s.* for watering assessment and wages and £11 9*s.* 11½*d.* as interest at the rate of 9 per cent on £127 13*s.*, there remains a net estimated profit of £19 16*s.* 3½*d.*, or 15·52 per cent.

IN BENGAL

The supari, or betel-nut is common in Eastern Bengal, especially in Tipperah, Backerguuge, and Dacca; and its cultivation is very profitable to proprietors of land. It bears fruit in the eighth year, and is most productive from that time to the sixteenth year, when the produce falls off. The nuts are gathered in November.

Betel-nut cultivation is very extensive, especially in the Police circles of Tubkibagara and Hajigunge. A considerable trade in this article is carried on with Dacca, Naraingunge, and Calcutta. The cultivators of the palm usually own a large piece of ground, slightly raised above the level of the surrounding country, and surrounded by ditches. In the centre of this they build their dwellings, and all round them they plant betel-nut trees. An acre of land will obtain about 3,000 trees. When first planted the betel-nut requires to be protected from the sun; for this purpose rows of madar trees are planted between the lines of betel-nut trees, and the growth of jungle is encouraged. When the betel-nut trees have grown strong, and no longer require the shade, the cultivators are too lazy and thoughtless to remove the jungle; and the result is that whole pergunnahs which were once fully cultivated are now covered with dense jungle, in which even the betel-nut trees cannot grow; while thousands of the inhabitants have been swept away by cholera and malarious fever of a very virulent type. The unhealthiness of the neighbourhood of betel-nut plantations is variously attributed to the dense jungle and under-growth above mentioned, to the exhalations from the trees, and to the malarious gases generated by decomposing vegetable matter in the ditches surrounding the plantations. The betel-nut trees grow to a height of about 60 feet; and in some pergunnahs they are cultivated to such an extent as to almost entirely exclude rice cultivation.—*The Indian Agriculturist.*

PLANTING IN JAVA.

TEA—ARABIAN COFFEE—LIBERIAN COFFEE.

We mentioned lately that the M. M. steamer "Oceanien" brought back to Ceylon, after a visit to the Straits, Mr. John W. B. Davidson, engineer of Messrs. Walker, Sons & Co., who set out in May last, chiefly with the object of doing business for his firm in the way of supplying coffee machinery to the planters in Java. Leaving here by P. & O. steamer in May, he made no stay at Singapore, but took the first steamer to Batavia, which he reached on the 27th of May. From Batavia he visited the tea districts, situated at an elevation of about 3,500 feet, and which are reached by means of a narrow-gauge railway in three hours. This railway he describes as very suitable to the needs of the country and the trains only capable of improvement in being furnished with a refreshment car, as the Ceylon trains are, instead of the refreshment arrangements being confined to a few stations on the route. His halting-place was Tjiwangie estate, a place of over 1,600 acres owned by a company, but having an Englishman, who is a part proprietor, in charge. Here he made his headquarters, and, going round the district, he says, he saw

TEA THAT SURPRISED HIM

very much indeed. "The growth and appearance of the bushes," he remarked, "were a great way ahead of anything I had seen in Ceylon in that time; in fact, tea 18 months old was something similar to the tea here three years old. The soil was far superior to the Ceylon soil, and they do not bother about weeds, and neither have they to manure. I must say I am rather surprised that more Englishmen do not go there, for there are only two Englishmen in the place that I know of, and they are keen on getting some of their fellow-countrymen there. I suppose I visited nine or ten estates in that district—all good, and furnished with well-equipped factories. Their process of manufacture is not like ours; they do not go in for withering to the same extent that we do, their tea being sun-dried, which entails a lot of work, and does not give good results. A fair proportion of the tea I saw was in full bearing.

ARABIAN COFFEE.

After leaving there I went to the East of Java, where there is nothing grown except Arabian coffee. This part is where Mr. Turing Mackenzie is, but I did not meet him, and only made a short visit there.

LIBERIAN COFFEE.

I next went to Samarang, where there is a great deal of Liberian coffee planted, and I saw it in various stages of growth, and noted that there was a great deal of disease amongst the trees. I also saw a quantity of cocoa; but this year's crop is an utter failure, owing to disease. I rode through a great many miles of coffee, planted by Government, which struck me as a novelty. The Government there plant up coffee, and what they grow is gathered by natives and pulped in the native villages. While going through the same district I saw some very fine teak forests. The Government goes in largely for planting teak trees, and lets out the forests to different people after the trees are in condition for felling. It was all beautiful teak wood. Then I returned to the tea district again, and visited one or two of the estates I had not previously seen, and then returned to Ceylon, having given up the idea I had of visiting Sumatra, and having practically also abandoned, for want of time, my visit to other parts of the Straits, though I called at Penang on the way down. Liberian coffee in Java is in a bad way at present, owing to low prices, as it barely fetches half what it did last year. Only the really first-class estates are maintaining the old high prices, and there is a great deal of disease about. Those who have Arabian coffee are still getting good prices, and there is some very good Arabian coffee in the place. I saw some over 100 years old and still bearing fairly well; but Liberian has gone down in price, and the disease trouble cannot be accentuated too much.

Mr. Davidson added that, professionally, his trip was a success, and his firm will be occupied for some time yet in executing the orders he brought back with.—Local "Times."

FEVER IN PLANTS.—Mr. H. M. Richards, who has previously studied the effect of wounds on plant-respiration, now describes (*Annals of Botany*, xi., 29) a course of experiments on the evolution of heat by wounded plants. He finds that accompanying the increased rate of respiration is an increase in the temperature of the parts affected. A kind of fever supervenes, and as in the case of respiration, the disturbance runs a definite course, and attains its maximum some twenty-four hours after injury. It is interesting to note that the attempt to rally from an injury is accompanied by somewhat the same symptoms, increased rate of respiration and evolution of heat, in plants as in animals. Owing to the nature of the case the re-action is less obvious in the former than in the latter, and a delicate thermo-electric element was required to appreciate the rise in temperature; but compared with the ordinary temperature of plants in relation to the surrounding medium, the rise after injury is "as great, if not greater than in animals." The maximum in all the plants investigated was between two and three times the ordinary excess above the surrounding air. Potatoes proved the most satisfactory objects for experiment, and it was found that in massive tissues (such as Potatoes or Radishes afford) the effect of injury was local, whereas in the case of leaves (*e.g.*, Onion-bulbs) a much greater extent of tissue was sympathetically affected.—*Natural Science.*

OUT WITH THE INDIA-RUBBER GATHERERS.

INDIA-RUBBER : ITS COLLECTION AND CULTIVATION IN NICARAGUA.

By ROWLAND W. CATER.

AT or near the month of all the large rivers on the Mosquito Coast will be found the bungalow of a trader, generally English or American, fitted up as a shop, and stocked with cloth, tinned and other provisions, rope, tobacco, rum, gunpowder, and similar necessaries. When the unsophisticated Indian from the interior has collected a canoe-load of Jungle-produce, such as rubber, vanilla beans, sarsaparilla, herons' feathers, gold, deer, Jaguar, and puma skins, &c., he pays a visit to the trader, and an exchange of commodities is promptly effected. Hard cash plays a very small part in these transactions. In due course the merchant ships the produce to New York or London, reaping a profit of—I am almost afraid to say how much per cent.—two or three hundred perhaps. At any rate the trader speedily makes a fortune large enough to recompense him for his banishment from some more civilised country.

Many of these merchants are large employers of labour in the shape of mahogany cutters and rubber collectors. The men, Indians and Caribs mostly, bind themselves to a patron for a certain period and become practically serfs. The laws regulating these 'mozos matriculados,' as they are called, are very severe and strictly enforced. The patron or master supplies provisions, implements and perhaps a small sum of money in advance, and each mozo is constrained to be diligent, and to return with the fruits of his labour at the expiration of the term. Rubber gatherers (huléros) are obliged to deliver one half of their caucho to their employer and to sell him the remainder at the current market price, less the value of the provisions, &c., previously advanced. But the patron almost invariably keeps a shop. He does not pay for the huléros' share of the rubber in cash, but mostly in goods. Consequently all the evils of the truck system are rampant.

A large proportion of the rubber exported from Nicaragua comes from the Prinzapulca district. At the mouth of the Prinzapulca River—called Apulca in some maps—there is a village where scarcely a week passes without the arrival or departure of huléros, and there I found myself during my travels on the Mosquito Coast. My host was one of the principal traders, an American, whom I will call Hayes. In his employ were many rubber collectors, so that I experienced no difficulty in making arrangements to accompany a gang into the interior. This comprised six men, four Mosquito Indians of pure blood and two Caribs of negro type.

We started at daybreak in the usual frail dug-out, and at nine o'clock the following morning reached the point from which the huléros intended to take to the woods. Disembarking, we concealed the canoe in a sedge thicket, and after a meal of boiled rice and salmon, set out across a sandy plain in the direction of a coneshaped hill. José, one of the Caribs, informed me that the rubber trees are usually found in groups of twenty or thirty, and that he had often travelled for days together without discovering a single one.

'Dis time, sah,' he added, 'we go straight to big lot. See dem long time ago.'

But José was unaware of what the elements had in store for us. A belt of forest intervened between the plain and the hill which was our landmark. I noticed pine trees, cedar, oak, and mahogany, interspersed with wild cherries and cacao, ceibas, or silk-cotton trees, and here and there a guayava, not unlike an apple tree, but with more foliage. This is the white guava, from the fruit of which the famous jelly is made. It grows to a height of twenty feet, and is to be found in many dry jungles as well as in almost every garden or patio. The apple-shaped fruit is a little larger than a hen's egg, smooth, and somewhat resembling a small lemon when ripe. Inside is an aromatic pulp full of small white seeds. The red guava of the West Indies is more acid and less agreeable.

We had cut our way through some miles of this forest, and had just reached a part where the undergrowth and creepers were less dense, when one of the Indians stopped suddenly and uttered an exclamation. A peculiar sound, between a moan and a sigh, was creeping through the woods; the tops of the trees were in motion

'Huracan, señor!' shouted the Indian in a tone of alarm, and all set off running as fast as they could.

I followed, buffeted by branches and climbing plants, and torn by thorns at every step. It was a desperate race to get into the open and out of danger before the dreaded hurricane should overtake us. In speed I was no match for those practised woodmen. They left me behind. The forest swallowed them up. But I could hear their shouts and the crashing of bushes as they tore their way, and I struggled on until I could run no longer. In a cleft of a big rock on the outskirts of the wood I crouched and waited for the storm to pass.

It came quickly. The murmur swelled to a roar. The sky grew black almost as night. Branches and twigs fell in showers. Great trees bent and swayed as reeds, groaning like giants in torture. Soon crash followed swiftly on crash as the older monarchs of the forest were swept down. Some, stripped of every branch, defied the fearful blast, comparatively safe in their nakedness. Others were torn up entire, and carried yards away from the great pit their roots had left behind. But while the tornado raged, even if I had dared to look out from my place of refuge, it would have been impossible to distinguish anything, except perhaps when a flash of lightning revealed the hurtling mass of leaves and branches overhead and all around.

As suddenly almost as it came, the hurricane swept onward and passed, followed in its course by myriads of twigs and small boughs, drawn forward it seemed by suction. For long afterwards these floated in the direction taken by the storm, resting apparently on the thick cloud of dust which seemed to reach from the ground to the tops of those trees that had withstood the storm.

No hurricane so terrific had visited Central America for many years, but luckily it was confined to the coast. Adjectives are of small use to describe its effects. These provided the Indians with a topic of conversation for months, and very marvellous were some of their stories.

An old man walking beside a river was said to have been lifted up and deposited on the opposite bank. An Indian who had lost his horse discovered it in the fork of a tree thirty feet from the ground, and was compelled to fell the tree to recover it. Whether it remained sound in wind and limb the more or less veracious chronicler omitted to state. Another found in his garden a row of banana trees which he had not possessed before. Great was the mystery until the owner of an hacienda many miles away identified them as his property. Some of the tales might be true—*Quien sabe?* Nobody is obliged to believe them. But I can testify that the hurricane was a very bad one, as also do the many wrecks remaining to this day on the beach near the mouth of the Prinzapulca and other rivers.

Pushing on over the debris, I eventually reached the hill, and there found the huléros, who had sheltered in a cave with which they were acquainted.

From the hill-top the keen-sighted fellows marked down several clumps of rubber trees not in the track of the hurricane and set out in couples to tap them. I accompanied José and Pete, the Caribs, both of whom spoke English after a fashion of their own.

Here I should observe that the best and purest rubber comes from the great forests intersected by the Amazon and its many branches. It is known

as Pará rubber, and is obtained from several species of Hevea. The India-rubber plant of our greenhouses is *Ficus elastica* of India, generally epiphytic, the seeds germinating at the top of forest trees, whence are sent down numerous aerial roots. Rubber, or caoutchouc as it is called commercially, is also obtained from species of Manihot, Landolphia, Willughbeia, &c., in addition to the subject of this paper, the *Castilloa elastica* of Mexico and Central America.

The Castilloa grows to an average height of sixty feet, and throws out its huge branches, many of them a yard in diameter, at a considerable elevation. The bark is of a dark slate or ash colour; the leaves measure from ten to eighteen inches long, are elliptical, glossy, closely veined, and paler beneath than above. They usually grow at the end of the boughs in compact groups of tree. The fruit consists of a capsule comprising three divisions, each containing a large seed, white, irregularly marked with black.

The best season for tapping is from August to February; and the operation should be performed early in the morning, before the daily rain, or in the evening after the rain has fallen. In the latter case the milk should be coagulated as soon after sunrise as possible next morning.

The milk, or sap, is white, and of the consistency of cream. The tree thrives best in moist but not marshy forests on a warm sandy clay. It seeds in the tenth year, and ought not to be tapped before its eighth year, or its growth may be much retarded.

On reaching the group of trees, which numbered seventeen of various sizes, my Carib friends first cut away the twining creepers that almost hid the trunks, and then carefully removed a couple of buruchas, natural ropes of rubber, formed in the following manner. From incisions in the bark, possibly caused by woodpeckers or some insect, the juice often exudes, trickling down the trunk, in and out of the encircling creepers, and sometimes reaching the ground. The milky stream coagulates and turns black as it runs, forming a long strip or cord, with which the huléros often tie up their bales.

The parasites removed, Pete and José strapped on their aspuelaa (climbing spurs), fastened at the knee and ankle, and having dug a small pit or basin at the foot of each of a couple of trees, passed a ring of stout rope round the trunks and their own waists, and walked up with their machetes between their teeth. By lifting the rope at every step they were enabled to stand almost erect, and when lying back in the ring both hands were at liberty.

José, whom I watched closely, commenced operations immediately before the first branch. With his broad-bladed sword he cut in the bark a horizontal canal which almost encircled the trunk and terminated in a V-shaped angle. From the point of the V downwards he next cut a perpendicular canal about two feet in length, which joined another horizontal channel ending in a V, and so on to the ground. In the last cut he inserted a large green leaf to serve as a funnel and guide the milk into the basin.

The Brazilian rubber collectors always place a receptacle of tin or earthenware in the hole at the foot of the tree to prevent the admixture of grit or other foreign matters; they also strain the milk through coarse muslin; hence the greater value of Pará rubber. But Nicaraguan methods are primitive.

The sap runs down the incisions to the basin, where the water evaporates. Artificial heat is employed to hasten this evaporation in Brazil, but happy-go-lucky Nicaraguans leave the process to nature. When the hulero is of opinion that no water remains, he makes a decoction of liana vines, or of a kind of convolvulus, and adds it to the juice in the proportion of one pint of the former to a gallon of the latter, when the sap immediately coagulates and forms india-rubber.

When the sap had ceased to run, my Carib companions ought to have filled up the canals carefully with mud or clay. There was a stream close at hand, but they did nothing of the kind. Consequently, when next they passed that way, the trees would probably be dried up and sapless. It is said that a kind of wood-leech attacks the tapped Castilloa, introducing itself through the channels, and so injures the tree as to cause its eventual decay. This the clay would prevent, and at the expiration of six months the tree might be again tapped, with as much profit as on the first occasion. I took José to task on the matter.

'Plenty hulé heab, sah,' he answered, grinning. 'Me find ten—twenty mo' trees while 'um doin' dat. An' what good? Perhaps I neber come heah no mo.'

To that I had nothing to say. The forests are No Man's Land, and another hulero would probably have reaped the fruit of his labour.

The heated air speedily evaporated the water from our rubber milk, and the necessary coagulation did not occupy much time, though the process appeared to me very wasteful. With this I will deal presently, however. While the evaporation was taking place other trees were being tapped. When the sun sank the Caribs left off work. We slept beneath the rubber trees, as is the huléros' custom. All the day following the Caribs toiled, and at sunset we returned to the dug-out, José and Pete carrying about forty pound of rubber each. The Indians, who had been less successful, were awaiting us. Next morning we ascended the river still farther and again entered the forest, leaving two men with the boat to take care of the rubber and pack it in bales.

Dishonest huléros frequently put stones and pieces of heavy wood in the middle of the bales to increase the weight. But the merchant usually pierces every package with a sharp-pointed steel rod, so the rogues seldom escape detection.

At the expiration of ten days, being then four days from the mouth of the river, we commenced the return journey, towing the bales of rubber behind the dug-out. We did not escape the usual capsize; but as each man had a life-buoy in the shape of a waterproof bag, and, besides, could swim like a fish, nothing more serious than a wetting resulted, and that we could not avoid on land.

These rubber bags, which a native of this coast is seldom seen without, are made by the huléros as they go along, so to say. A sack of unbleached calico is stretched on the ground, and painted over with rubber milk, a coco nut husk serving for a brush. When the first coat is dry the operation is repeated, three coats being necessary before the bag is fit for use. The result is a waterproof article, rather heavy, but in every other respect far superior to any manufactured in Europe. Before setting out in their trail canoes, the natives take care to inflate their bags and tie up the mouth. Thus the sack forms a receptacle for clothes, a pillow on land, and a life-buoy in the event of an accident upon the water.

On arriving at what was left of Mr. Hayes' bungalow, for the hurricane had not spared it, I had several discussions with that gentleman in reference to the practical cultivation of *Castilloa elastica*. The result of my inquiries on the Mosquito Coast and in other parts of Nicaragua are here summarised

The subject has been ventilated by many private persons in addition to the various Central American governments, and in Nicaragua a bounty of ten cents native currency is paid for every tree planted. As the world's supply is rapidly diminishing, while the demand is increasing by leaps and bounds, there appears to be a magnificent field for Englishmen with capital. Certainly, unless the output is soon increased, manufacturers of rubber goods may have to fall back upon substitutes. In Mexico there are English and American Companies already at work, but, except two plantations in the Chontales district, I am not aware of anything of the kind in Nicaragua. That the industry would be exceedingly profitable has been demonstrated by the results of many experiments; and when I say that neither coffee, tea, cocoa, sugar, bananas, indigo, nor hemp growing would pay so well as the cultivation of india-rubber

trees, I speak on the authority of Mr. Hart, F.L.S., of the Botanical Gardens, Trinidad.

In March of last year I visited a plantation in Chontales, which, strange to say, is the result of native enterprise. It then comprised one thousand trees, well developed, of hardy appearance, and as large as a good-sized apple tree. An early maturity seemed assured.

Señor Romero, Mexican Minister to the United States, in an article published in the *India-rubber World* (New York) for April 1892, estimates that each sixty-year-old tree, planted at intervals of fifteen feet, will have cost eight cents U.S. currency, and will yield six pounds of rubber. Other authorities fix the yield at maturity as high as fourteen pounds of rubber. It depends on whether the season has been wet or dry, and whether the trees are well or badly cultivated.

In order to be on the safe side, I propose to estimate the cost to the end of the eighth year at 18 cents U.S. currency, or 9d. per tree, and the eighth year's average yield at five pounds of rubber. The market price of good Central American rubber is 2s. 4d. per lb. Pará rubber fetches from 2s. 3d. to 3s. 6d. per lb.; and if gathered and coagulated in the same cleanly manner, rubber produced in Nicaragua should be worth as much. Nevertheless, I prefer to estimate on a selling-price basis of 2s. per lb. only. The result at the end of the eighth year of an acre plantation comprising 193 trees planted fifteen feet apart would be as under, including the premium of ten cents native currency—say 3d.—per tree paid by the Nicaraguan Government.

Dr.		Cr.	
Cost of cultivation for the term of eight years, with seed, &c., cf 193 trees at 9d. each......	£7 4 9	Government premium of 3d. per tree............	£2 8 3
Cost of tapping or harvesting......	3 0 0	Yield of 193 trees at the end of the eight year —965 lb. at 2s. per lb.........	96 10 0
To balance......	88 13 6		
	£98 18 3		£98 18 3

Profit............£88 13 6

I arrive at the cost of tapping, or harvesting, in the following manner: A huléro, working in the dense, overcrowded forest, can tap four wild, creeper-grown trees in a day; therefore it stands to reason that, in a plantation where the trees are weeded and cleaned of all superfluous growth, he could tap five at least, and also plaster up the cuts with mud. Thus the 193 trees would occupy him 39 days. A mozo in Nicaragua is well paid if he earns fifty cents native currency, or say 1s. 3d. per day, but I have calculated his daily wage at rather over 1s. 6d.

Supposing that the plantation comprises five hundred acres, then, on the above figures, the eight year's profit would amount to the enormous sum of £44,337, 10s. And the yield increases every year, with no outlay except for weeding and harvesting.

The gross capital expenditure for the eight years I estimate as under:

Cost of 500 acres of land at 5s. per acre.	£125 0 0
Surveying and procuring titles thereto.	100 0 0
Clearing land fcr planting..............	1000 0 0
Collecting seed and planting...........	500 0 0
Eight yearly weedings at £200 each....	1600 0 0
Extras, implements, &c.................	300 0 0
	£3625 0 0
Interest on £3625 for eight years at five per cent. per annum..................	£1450 0 0
Planter's expenses, cost of living, &c., for eight years at £200 per annum.......	1600 0 0
Cost of gathering the eight year's crop.	1500 0 0
	£8175 0 0

I have included in the above the cost of maintaining the planter during the eight years that should elapse before the Castilloas are tapped; but it should be borne in mind that when the trees are planted fifteen feet apart, coffee, sugar-cane, cotton, cacao, and other shade-loving plants, yielding yearly crops, may be grown between them, and their produce should maintain the planter. But adding five per cent. interest, the planter's expenses, and the cost of harvesting, there still remains a net profit of £36,162, 10s. Estimating the value of the ninth year's yield at £50,000, and deducing £200 for the annual weeding, £1,500 for the cost of harvesting, £180 for interest, and £600 for the planter's expenses, the net profit for that year will amount to £47,620, which is a pretty good return for a net capital outlay of £3,625. Of course it will be necessary to maintain a nursery of young plants to fill vacancies caused by accidents and replace trees when their rubber-bearing life is over; but the cost of such a nursery would not be great. And one must not count on the Government premium being paid in perpetuity.

In reference to the life of a rubber tree and its increasing productiveness, the following extract from *The World* (New York) of 21st August 1892 will be of interest:

'Three young trees transplanted from the forest to a cultivated field in Soconusco, Mexico, are now said to be seven feet in diameter, and have yielded rubber for more than thirty-five years; the present product averaging more than fifty pounds of gum per year.' The average increase is generally estimated at one pound of rubber for each year of the tree's life up to a certain age, which, however, I am unable to fix.

On the eastern side of Nicaragua, and especially in the Mosquito territory there are immense tracts of land suitable for the cultivation of *Castilloa elastica*. In choosing land, shelter from strong winds, the greatest enemy of young Castilloa, should be kept well in view. The seeds should be sown in a nursery bed shaded from the mid-day sun, and the young plants transferred to the hacienda when twelve months old. For each plant a hole should be dug three feet in diameter and one foot deep, and filled with fine loamy soil to which a little sand has been added. The mixture should be well-trodden down and watered night and morning for two days, when it is ready for the young Castilloa, which must be placed in its new bed at exactly the same depth as in the nursery; if it is weak, a stake support is very desirable.

Trees tapped in the wet season are estimated to yield five times as much milk as in the dry. The quantity of rubber produced therefrom depends to a great extent on the coagulating agent employed. Sixty per cent. of the milk ought to be turned into rubber. A very good agent is one ounce of alum dissolved in sixteen ounces of water. But a weak alcoholic solution will give even better results, for the process is immediate, and the solution may be used many times. In my own experiments I never lost mose than forty per cent. of the bulk, and often only thirty-five per cent.

That the cultivation of *Castilloa elastica* is worth the attention of the thousands who are seeking really remunerative investments there cannot be the slightest doubt, and this the author intends to show in a work on the whole subject of india-rubber which he hopes to publish shortly. For success careful study and inquiry is imperative.—*Chambers's Journal.*

THE DISEASES OF PLANTS.

Throughout a long series of years the pages of the *Gardeners' Chronicle* have from time to time conveyed much information regarding the diseases and ills connected with plant life—and its work continues, for the foes still advance. Now-a-days, however, the prevention and remedy of disease come more to the front, and naturally this aspect appeals to the cultivator of plants. There has never been any lack of suggestions for the cure of disease in our gardens and plant-houses, yet within the last ten years of thereabouts, remedies may be said to have showered on us at all times and in all kinds of gardening periodicals, till one feels lost in the numbers,

and when a pest appears amongst our plants it is difficult to know what to do.

The subject of diseases of plants is a wide one, too large to be successfully grasped, even after long experience, while in many points there is too much obscurity as to the cause of disease to allow of successful treatment of cure. From the multitude of diseases liable to appear amongst plants, two classes stand prominently forward: (1) those due to the action of parasitic plants particularly Fungi; (2) those due to injurious animals, particularly Insects. The remaining diseases have their cause in adverse soil conditions, in mistakes of cultivation, in defects in the plants themselves, or in other causes at present difficult or impossible to make out. In the present series of papers it is proposed to deal with the first class of diseases only—with those caused by the action of injurious plant-organisms on such plants as are useful to the out-door or in-door gardener. Diseases of this class are sufficently common and disastrous enough in their results to be only too familiar, and their importance needs no further emphasising than to recall the ravages of Potato Disease, Vine Mildew, Damping-off Fungus, and the Hollyhock Rust of former days, not to mention the thousand-and-one mildews, rusts, and blights of less consequence. The subject of fungi is, to the ordinary gardener or cultivator of plants, one fraught with many difficulties arising from the minute structure and complex life-history of these tiny organisms, and any text-books available tend to bring these very difficulties into prominence. This is no doubt necessary and valuable in its way, yet we believe that, as in a "first aid" ambulance training, it is possible by a few exact observations to know enough about a funguspest to understand how to proceed against it. We do not then propose to deal with the fungi themselves any more than is necessary to understand them, but refer the seeker after detail in this direction to the books, some of these are—*Diseases of Field and Garden Crops*, (1884) Worthington G. Smith; *Diseases of Plants*, Professor Marshall Ward; *Diseases of Trees*, Translated from the German by Professor W. Somerville (Macmillan, 1895); *Diseases of Plants due to Cryptogamic Parasites*, Translated from the German by William G. Smith (Longmans, 1897).

For all kinds of plant-diseases the treatment is one of two kinds: (1) preventive, aimed at keeping the disease away altogether; (2) remedial, which aims at destroying the offence. To prevent disease is more truly the work of a gardener than to cure it, for, after all, his efforts towards remedy cannot go much beyond the stage of "first aid;" if more be needed, the specialist should be applied to. To keep one's plants free from disease requires more skill, foresight, and experience than to try remedies; it also demands great patience, for, as it were, the results are negative, no disease appears; but, on the other hand, the value of the crop repays all the extra care in raising. WILLIAM G. SMITH, Edinburgh.—*Gardener's Chronicle*.

LIBERIAN COFFEE.

The extension of Liberian coffee cultivation in S. India, in many cases in an experimental stage, in others on a more extensive scale, is ample excuse for my calling attention to the results actually obtained in Ceylon, and a district where there is very so far old Liberian coffee not a thousand miles from Cape Comorin.

LIBERIAN IN CEYLON.

In Ceylon in the latter seventies there was a considerable amount of land planted with what was fondly hoped was going to replace the Arabian variety. The original plants were planted at too high an elevation, and not making any satisfactory growth were removed to a lower elevation, where they throve admirably, and I believe brought in the fortunate proprietors as much as 4 as. a cherry. What has become of all the Liberian planted in Ceylon at that time is not hard to say, as it has practically disappeared, and to such an extent that not long ago I saw Liberian coffee cultivation alluded to as a new product in a Ceylon paper. The causes of its disappearance were various, in many places the soil was unsuitable and probably the treatment, and the coffee more or less came to an untimely end by starvation, death being in many cases accelerated by a mamoty. The low price of the coffee was another great cause; I think about 1884 it was only worth some R5 a bushel of rice coffee. This cause led to the cutting out of some decent coffee, some that I saw being so well grown that hitching an elephant on to the trees was considered a cheaper and more efficacious system of removal than by coolies. There was yet another cause, a cause that I hope Indian planters may be spared, and that was bug. Bug obtained such a hold on the coffee, and throve so well, that the only way of getting rid of the bug was cutting out the coffee. At the present day I see the Delgolle Company refer to Liberian coffee, of which they have a considerable acreage of young coffee, in a most discouraging way, both as regards present crop and future prospects. As the result of all the Ceylon experience, it may safely be inferred that Liberian coffee wants good soil. Crossing the water there is some old Liberian to be found which bore well and steadily for years, but is now unfortunately in a very unhealthy state.

LIBERIAN IN INDIA.

One clearing along a stream being, I believe, affected by the extensive felling of the forest on both sides which must have had a great effect on the moisture during the dry seasons, and another clearing, which was under heavy forest shade, has been terribly damaged by thinning the shade so much so that it is being densely planted up with artificial shade in the hope it may save it. There would be nothing very serious in this as it would only point to shade being a desideratum for Liberian, but the most serious thing is the failure of young coffee planted three to four years ago, even when planted with shade. This would, I think, point to deterioration of the seed, and I am confirmed in this by the opinion of the planter who originally planted the old coffee, who holds that Liberian does not grow as it used to. There is no doubt that looking at any lately planted coffee and comparing it with the old original trees, that it seems an impossibility for the stems to attain the same size within any reasonable time. There is another item of interest in regard to Liberian, and that is that the crop has been a complete failure last year and the year before through drought, the blossom failing to set. That long droughts are not good for it I think may be taken as proved by the success of this species in the Straits, where I believe they seldom have a month of the year without rain.

DIFFERENT JATS OF COFFEE.

There is a very important thing to be borne in mind in planting Liberian, and that is that there are distinct varieties of the coffee, one bearing much heavier than the other. So that in starting a Liberian as in a tea clearing, the importance of jat is of vital importance. From all I have seen of Liberian in Ceylon and on the continent, the successful growth of the tree seems to require—

I. Good soil.
II. Plenty of moisture.
III. Shade where at all liable to drought.
IV. Selection of the right jat.

In reference to the deterioration of the trees, it is harder to know how to meet that. Importation of fresh seed from Liberia would undoubtedly be the best way, provided any guarantee could be had that it was the right variety and carefully selected, but it is questionable I think whether it would not be better to rely on the survival of the fittest; careful selection and cultivation of the parent seed trees would I believe be as good a way as any to ensure success of future clearings and avoid repeating past mistakes. I may be wrong, but I am strongly of opininon that sufficient care has not in many cases been paid to the selection of the seed. Taking a bushel of parchment out the store for seed is hardly the way to command success. I hope some of your readers will let us know how far their experience of Liberian coffee agrees or differs from the somewhat unsatisfactory experiences I have related.—B. NELSON.—*Planting Opinion.*

FRUIT CULTURE IN CEYLON—ORANGES.

One direction in which we are rather anxious that the enthusiasm of the new Director of our Botanic Gardens should benefit the agriculturist, is in connection with Fruit Culture. We have seen, and heard of, many interesting experiments with the cultivation of fruit, not alone in private gardens, but also on estates supervised by planters of horticultural tastes, whose leisure hours are not too exclusively devoted to "sports and pastimes." Few pursuits can give greater pleasure than horticulture; while scarcely anything can contribute so largely to the pleasures of the table and the maintenance of health in a tropical climate, as the produce of the garden—flowers, fruits and vegetables. The Udapussellawa, Maturata, New Galway and Nuwara Eliya planters have always been foremost in their interest in the cultivation of fruit; and of recent years Mr. Nock's operations at Hakgala have contributed materially to maintain and stimulate that interest, and to add to the list of table delicacies. But there is no reason why Fruit Culture should be confined to the upland districts, and we know some lowcountry planters—prominent among them the veteran Mr. W. H. Wright of Mirigama—who have in the Western Province, taken an intelligent and successful interest in the growth and propagation of indigenous and exotic fruits. Generally, almost exclusively, the efforts of the growers have been directed towards supplying their own personal needs, and, perhaps, those of their own friends; and seldom have attempts in the past, been made to supply the Colombo market or shipping. We are bound to say that such as have grown fruit beyond their personal requirements, and made the attempts to find a market, have not a very encouraging story to tell. "Fruit Culture looks very well, indeed, on paper," they say; "and if one could only derive from 50, or even 20 acres, the profits estimated per acre from limes, or oranges or pineapples, one would not need to trouble oneself at all about tea, or coconuts, or other big products. It is when the fruits have to go to market that one realizes the hopelessness of the venture, with railway freight exorbitant and the market rates infinitesimal." We cannot dispute the facts which our friends submit for consideration; but we refuse to accept the conclusions as inevitable, or permanent. There are difficulties in the way of every new venture; and until supply and demand are fairly regulated by experience, the grower must be prepared for some disappointment. We have known a Kentish fruit grower send 50 bushels of plums to Covent Garden and get back a debit note for 1s 6d! A rush of plums spoilt the market for the time, and railway rates—since amended—were too high. So in Ceylon we want special "fruit" rates by railway and market experiments, before giving up hope in this new industry. For how many years, for instance, was not tea, now the first among our great exports, looked upon as an interesting shrub, but without any commercial value in the special circumstances of the island? We have heard a story of the Messrs. Worms who exhibited some specimens of made tea, manufactured on one of their Ramboda or Pussellawa properties by an imported Chinaman, at a Colombo Agri-Horticultural Show. Mr. George Wall, himself the largest local importer of China tea—coffee being then King here—was one of the Judges at the Show and pronounced the samples excellent, and worth a guinea a lb. "It cost us about five guineas a lb. to make," said the shrewd and enterprising elder Jewish Planter-Merchant Mr. Gabriel Worms! And yet, the collapse of coffee was the opportunity for tea, which is now manufactured and placed in the market at a ridiculously low cost from certain favoured places. The laws of supply and demand have solved problems which once seemed insoluble; while improvements in machinery, co-operation, and the handling of increasing quantities, have helped to reduce the cost of production to a minimum. So it must be—and we trust soon will be—with Fruit Culture in Ceylon. There is money even in the commoner fruits of the country, such as those we have named; but the grower will, for some time, have to be his own purveyor until a regular trade is established. One obstacle to success, which has been brought to our notice by a lowcountry planter who grew Mauritius pines in abundance a few years since, is the contract system which finds favour with Hotel Managers, and specially with Steamer Agents. Applications to such quarters, too often result in references to the Dubashes and Purveyors from whom alone they draw all supplies; and these are, of course, only prepared to pay bazaar wholesale prices of the lowest standard! Quality, size and flavour were denied a place, in the calculation. The dozen was their standard! And being paid by the dozen, they supplied by the dozen without troubling themselves in the least about quality! What wonder that, under such circumstances, Ceylon fruit served up on board-ship are generally a disgrace to the island, and that passengers who drop in for a day or two into our hotels, carry away a very poor notion of local fruit of all kinds. Surely, it ought to be worth some one's while to start a really good fruit-stall in the Fort, or within easy reach of it, where the best specimens of local fruit could be made available to householders and passengers. The drawback of the climate can now be guarded against through the cheapness of ice, while a steady demand might result even in the growing of some at least of our fruits out of season. Perhaps the enterprising promoters of the Cold Storage Company will see in our suggestion a means of increasing the usefulness of their charge and supplying a farther want of the community. We are aware that Mr. Wright, already mentioned, has had an interesting and successful experience in one direction this very season. For the present we do not go into particulars; but erelong we may have some account of his fruit-growing experiments from this veteran planter.

So much for the commercial aspects of the question, which we have thought it necessary to discuss fully, quite as much in the hope of eliciting useful suggestions, as of making the public fairly acquainted with the difficulties in the way of fruit-growing as an investment and a source of income. We now turn to the cultural aspect of one of our commonest and most wholesome fruits, which has been suggested by an article in the *Trinidad Bulletin* published by the Botanical Department of that island. The article is a most suggestive one, from the pen of Mr. Hart, the Superintendent of the Royal Botanic Gardens, and emphasizes the need of grafting in dealing with the citrus species. To the question, do oranges come true from seed? the writer, after a careful consideration of the *pros* and *cons*, returns an answer

in the negative. Though direct evidence may be wanting, tracing plants from the seed in the nursery to their growth duly labelled, until they fruit, the experience of observant people corresponds with the general belief among, what may be called, the uneducated classes, that sweet orange seeds do not invariably produce sweet orange plants. The testimony of Professor McOwan, in his Manual of Practical Orchard Work for Cape Colony, is quoted in the following terms :—

"It would therefore appear that the colony possessed in the first instance excellent named sorts of this delicious fruit, but by the cultural error of propagating by seeds a mongrel race has sprung up, which does justice neither to the exceptionally suitable climate of the Cape nor to the possibilities of the ruit itself."

And the Professor thus quotes an eminent Florida grower :—

"Do not let any man or number of men in a pomological convention induce you to establish a seedling orange grove. If you do, you will some of these fine days wake up from a Rip-Van-Winkle dream and find yourself as far behind the age as he is reppresented to have been.

"No two seedling orange trees will ever produce fruit exatly alike, consequently your fruit will become promiscuous and variable in character and quality, and your neighbours who have selected known and uniform varieties will find a more ready demand and sale at fully 50 per cent advance on what you can get for your mixed promiscuous fruit."

Another authority, while admitting that "seedlings of the sweet orange produce fruit similar to those produced by the parent," observes that "there is yet much variation in the fruit from such seedlings." Now, these are important facts to remember by those who would engage in orange culture—that a sweet orange seed may produce a tree bearing sour or bitter fruit, and that if the tree be true to type as regards sweetness, the quality of the fruit may be very different from that of the parent tree. In regard to the production of the "bitter sweet orange," we have curious confirmation from a Veyangoda planter, who has a grove of sweet and sour oranges planted by the former proprietor as sweet, and whose own plantation of sweet from seed has produced different varieties. Last year one of these plants had a first crop of a few fruits which he took for large rough skinned oranges. They ripened yellow and looked very tempting; but when cut the rind was almost as thick as that of the shaddock, without the spongy protuberance at the stem; while the taste was different from both the orange and the shaddock. He finds no difficulty in calling it now a bitter sweet! The remedy for this variation from type is said to be grafting; and here is what Mr. Hart writes :—

"We can say without hesitation grafted plants for choice, if planters can afford it; for though costing more, it is true economy in the long run. Such plants will fruit earlier, will be true to name, will deceive no one, will allow the grower to put a regular class of fruit upon the market; their quality can be depended upon, and a fruit can be grown exactly to suit the grower's taste, or to suit any particular demand. Grafted plants will certainly be much dearer to plant than seedlings, and at present few would invest at the rates which would be charged for them; but if a certain and continuous demand arose, this price would certainly be reduced and grafted trees would be sold at reasonable rates."

This is one direction in which the Royal Botanic Gardens and the School of Agriculture should combine their forces for the public good, by raising grafts, giving "demonstrations" of the best methods of grafting, and teaching practical grafting as a special subject. The article itself is so interesting, and likely to prove so useful, that we shall reproduce it in full in the *Tropical Agriculturist.* As we have said, the orange is one of our commonest fruits and it is grown in almost every native garden; but—as usual in the case of Sinhalese—without any attention to cultivation. We have tasted oranges of splendid flavour, equal to anything we have tried on the Continent of Europe or in England: but the flavour can be ascertained only after tasting the fruit! The general belief is that oranges grown on the seaborde, or in the low-country, are far superior to those grown upcountry. If the verdict be correct, what is the explanation? Meanwhile, we trust that what we have written may stimulate investigation and experiments.

BOTANICAL INVESTIGATIONS.

The news comes from Cambridge that the special Board for Biology and Geology has voted £100 to Mr. H. H. W. Pearson, B.A., of Christ's College in aid of his expenses in visiting Ceylon for the purpose of making Botanical Investigations, the grant being conditional on the recipient reporting to the Vice Chancellor the results of investigations in a form suitable for publication. The grant is made from the "Wort's Travelling Scholars' Fund." A grant of £300 is also made to Dr. Haddon for anthropological researches in Torres Straits. As Mr. Pearson comes from the same College as Mr. Willis of Peradeniya, they will no doubt co-operate heartily in the work to be undertaken.—*London Cor.*, local "Independent." [Dr. Haddon is Professor Alfred C. Haddon also of Christ College who spent a year in Torres Straits and New Guinea some time ago. Professor Haddon is an enthusiastic Naturalist and Anthropologist. —ED. *T.A.*]

PLANTING IN JAVA.

(*From a Correspondent.*)

I have a letter from Java in which I get the following information :—Java soil is a long way ahead of Ceylon, but for all that they have many difficulties to overcome. Labour is scarce, and very bad at its best. Cholera is very bad in Soorabaya. Sugar planting is almost at a standstill owing to heavy fall in prices. They expect a very heavy crop.

A TRIP TO THE TRAVANCORE HILLS.

FINLAY MUIR'S ESTATES, &c.

(*From a Correspondent.*)

From Bodynaikanur up to Devikulam is a ride of about 30 miles, 5 to the foot of the hills, 10 up a terribly steep ghaut some 4,500 ft. in height, and then 15 more through a beautiful grass valley shut in by high cliffs and fringed with thick forest, rising at the end up to nearly 6,000 ft. Once over this pass we enter the property of the North Travancore Agricultural Society, which, with the exception of a few private estates, is now owned by Finlay Muir & Co., whose operations are spread over Ceylon, Assam and Travancore, and who have a capital of two millions sterling to back them up. About 2½ years ago Sir John Muir bought up the whole of the shares of the old Society. The shareholders did not benefit much, for they only got about R70 for every R100 invested some 15 years previously. But

sic vos non vobis appears to be the motto of all pioneer Companies, and Sir John Muir acquired an estate of some hundred square miles with at least thirty thousand acres of virgin forest for next to nothing. Counting only the forest land, the cost was not more than R10 per acre for land which in Ceylon is worth from R150 to R200. Since the purchase, the new Company has not let the grass grow under its feet. Something like 5,000 acres have now been cleared and are being planted out with tea and coffee. The original Company confined its operations almost exclusively to cinchona, but the slump in the price of bark left so small a margin of profit that most of the trees have been cut down and replaced by tea or coffee. There are, however, still some 700 acres of cinchona belonging principally to private individuals, and the bark yields a very good percentage. The head-quarters of the new Company are at Munaar, about 8 miles west of Devikulam, in a beautiful valley where three rivers meet, to fall shortly afterwards, through a gap in the hills, nearly 1,000 ft. into the Travancore low country. Here the visitor cannot fail to be struck by the enormous energy that has been displayed. On all sides are huge clearings divided into estates of about 500 acres each, looked after by a manager and two *Chinna Dorais*. The elevation here is about 4,500 ft, and the lower part of the hills are therefore planted with coffee, the higher ranges being reserved for tea.

From Munaar to the Pulliar Valley is a ride of 14 miles, first of all through a pretty valley with what ought to be a trout stream running at the bottom, past two big tea clearings and through another, and so up to the top of the Pulliar gap. Here we look almost due North, down a valley sloping from about 5,000 ft. down to the Anjanaad and the low country of Coimbatore, distant between 60 and 70 miles. To the right are steep, rocky mountains, with precipices falling sheer 1,000 ft. and more, and above them towers the summit of Anaimoody the highest peak of Southern India, being about 50 feet higher than Dodabetta. These hills are generally covered with thick mist and are still the haunt of the ibex, whilst the valley at the head of which we stand used to be the favourite feeding ground of herds of elephants. For four or five miles we go down through thick virgin forest with a dense undergrowth. As we get down into the valley we come across extensive coffee clearings. These belong entirely to private individuals. Some of these, however, have recently been bought out by the new Company. Some of the coffee here is very fine, and one small estate of 60 acres, which was only planted out 2½ years ago, was pointed out to me as having been recently valued by a Ceylon expert at £6,500, or more than £100 per acre. The soil is excellent, for the dense forest has until now never been touched and the ground is thick with the vegetable accumulations of centuries. But the great drawback of these valleys seems to be the violence of the monsoon. From the middle of June until the end of August the rain comes down in perfect torrents accompanied by a heavy wind. I was told that last year in Munaar the rainfall was over 200 inches, and here in Pulliar it was over 180. The consequence is that not only are the planters cut off from their communications, but they are also put to considerable trouble and expense in protecting the young plants and trees from the wind and rain. For three consecutive years after the coffee seedling has been planted, it has to be staked, which involves a considerable amount of labour and cost. Even then the wind and rain cause many vacancies, which have to be replaced, not to speak of occasional landslips which may carry away an acre or two of promising trees. The valley we are now in is affected by both monsoons and the N.-E. wind has a very withering effect on the young trees especially, and it is chiefly where there is a South aspect that the plantations look better. But this is a very valuable valley and has produced some very fine crops. In course of time no doubt the new Company will buy up the old estates and open out the remaining forest.

From Pulliar back to Devikulam by another route is about 15 miles. After climbing a high hill we pass through an extensive cinchona clearing of nearly 500 acres, lately the property of a small Company in Madras, but recently bought by Finlay, Muir & Co. Uncommonly fine trees they are too, but until there is a rise in the price of the unit they are hardly likely to be barked. We then go down a steep hill, cross one of the Munaar tributaries, up through a thick forest with a dense undergrowth of creepers and ferns, and then over some grass hills, past a 300 acre cinchona clearing belonging to Mr. Kindersley, of Ootacamund, through some other cinchona clearings belonging to the Devikulam Company, one of the two private Companies left, and so back to Devikulam, after having completed a round about 45 miles in circumference.

We have, however, only seen about one half of the whole concession. To the West the thick forest extends down to 1000 ft. from the low country, and work is actively going on there, whilst to the East there are also large clearings where tea is being planted out. Although Finlay, Muir and Co. own about 30,000 acres of forest in this concession alone, this extensive tract of unopened land does not seem to satisfy them, for they have also purchased from the Travancore Government other forest land outside the concession and towards the British boundary. Here they are engaged on a large clearing for coffee, about 500 acres in extent for which they have not hesitated to pay as much as R50 and R60 per acre, although the concession forest stands them in at R10 per acre only—leaving the enormous extent of grass land entirely out of the question. As was to be expected, this activity has excited a considerable amount of competition, and Mr. Knight, the well known planter of Ceylon and Peermaad, has recently acquired 1,000 acres in a valley outside the concession, for a large portion of which he had to pay as much as £5 per acre. Within the concession itself land is no longer procurable, for Finlay, Muir and Co. will not part with an acre, and there seems little doubt that in a very short time all the available forest land will be sold at prices ranging above £10. It seems a pity that all this valuable land should be lost to Madras enterprise. The original North Travancore Company, which obtained the concession, languished for 15 years. It had too little capital of its own to open out more than a fraction of the huge concession; very few private planters took up land even at the low rate of R15 or R20 per acre, and the original shareholders had to sell out at a loss of 30 per cent besides interest for 15 years. Now it turns out to be a valuable property, and a concession the value of which may be said to be nearly R30 lakhs has passed into other hands

for less than three! One natural effect of this great activity has been to send up the price of labour. Cooly labour now costs 5 annas per diem, and many of the managers are bitterly complaining about the contractors and the difficulty of recovering advances. A curious and significant incident in connection with famine labour may be mentioned here. Sir John Muir offered to employ a gang of 500 Cuddapah famine coolies. Scarcely had they arrived at Munaar than in spite of good wages and a cool climate a great part of them absconded. Government work on famine dole in a parched-up country was pleasanter to them than hard work in a strange country at double the wages. The incident is significant of the apathy of the Indian cooly, who prefers dying at home to working in a distant district.

It may be safely calculated that in two or three years' time there will be about 25,000 acres of forest planted out on these hills, yielding a produce of not less than 5,000 tons annually, exclusive of traffic in rice, and other supplies. A very large portion of this must find its way to the Cumbum Valley for transport to Tuticorin, the nearest harbour, and would go a long way towards providing a dividend for the electric railway which ought to be constructed there. At present there is no agency on the hills, and not even a shop. All money for payment to coolies, stores, rice, supplies, &c., are sent from Madras, the money either in specie or in notes at considerable inconvenience and loss of time. Here again would seem to be an opportunity which Madras firms would do well not to lose.—*M. Mail*, June 30.

TEA IN COORG.

Sir,—In your issue of the 25th June, in the course of some editorial remarks on the proceedings of the Annual General Meeting of the Coorg Planters" Association, you state:—"Thus one more coffee district has succumbed to favourable prospects held out by tea, and very soon we may expect to see Coorg in the transition stage from coffee to tea in which Wynaad and the Nilgiris and some other districts now are." Kindly allow me to suggest that the sentence as it stands would lead one to infer that the cultivation of tea is rapidly displacing that of coffee in South India—whereas, if you will kindly refer to the latest statistics of the Planting Industry collected by *Planting Opinion*, or by the U. P. A. S. I., you will see that king coffee not only reigns supreme, but seems bent on maintaining his supremacy, to judge from the large extensions made, and the new districts that are being conquered, since the nineties began. Only Travancore figures as far more a tea than a coffee district; but this has been its condition for years past, I believe. The tea planted in the districts of the Nilgiris, Mysore, Wynaad, Coorg, Pulnies, &c. is either *nil*, or very small in extent, except on the Nilgiris. On the Nilgiris there has always been, concurrently with coffee, a fair area of tea cultivated. The same in Wynaad, but to a very small extent only, until recently, when lands, years ago proved unsuitable for coffee, are now being to some extent reclaimed by tea; but to say that Wynaad and the Nilgiris are in the transition stage from coffee to tea is altogether contrary to facts, as it implies that the cultivation of coffee is being given up for that of tea. The cultivation of tea is extending, it is true, but it by no means follows that it is going to, or, for that matter, is intended, to displace coffee. On some very old coffee land, or on land more or less originally unsuited for coffee, it may do so, and thereby prove a valuable adjunct to coffee. Nor can I see that the way tea is mentioned in the Report of the proceedings of the Coorg Planters' Association warrants the inference that Coorg expects to be in a transition stage from coffee to tea. I am sure, most planters will have read your remarks with much surprise. We have had two most erratic, and quite uncommon, flowering seasons, first, in the unprecedented drought of the spring of 1896—a good deal worse than the prolonged drought of 1895,—followed by a want of seasonable cold weather in 1896-1897 after quite abnormal rains in the fall of 1896 and early rains this spring so soon as February last; but I have yet to meet the man who, in the face of the vigour and health of the coffee tree of today, and of its most rapid recovery from an attack of leaf disease a few months back, the like of which I do not think the districts have been visited with since 1891, and who has an estate worth anything, is prepared calmly to sit down, and begin to count up the cost of converting his property into tea on the ground that his coffee is not going to bear any more. I have heard of one man who did this, some years ago, and then within 18 months picked one of the best crops his place ever gave, and it is still going strong!

—*M. Mail*, July 1. SEMPER FLOREAT.

THE SOLOMON ISLANDS.

Mr. Woodford, in the course of his sojourns, found some difficulty in getting at terms with the natives owing to the number of dialects. Fijian, however, appears to be very similar in roots and inflections, and in this language the Commissioner could generally make himself intelligible. The natives themselves live on very easy fare. One of their principal foods is a preparation of sago flour and pounded almonds. This they bake into cakes. "These cakes." Mr. Woodford testifies, "are most excellent and sustaining food. From their portability they are taken by the natives upon canoe voyages, as they are not liable to damage by salt water and, moreover, are most convenient to sit upon." Many more interesting things does Mr Woodford tell about the Protectorate and the people. The trade, which is done entirely by Sydney merchants, is mainly in copra (dried half-coconuts from which oil is extracted), ivory nuts (the fruit of the sago palm used chiefly for making buttons), and pearl and turtle shells. Mr. Woodford, who has visited the islands before has great belief in the possibilities of a larger trade in the future, and considers that capital might be profitably expended in the growing and gathering of indiarubber, sago, sponges, and certain timbers. The European population, though it numbers only fifty souls, is growing with the prospects of increased trade. In the Solomons, as in other island groups of the Pacific Oceania, the British Protectorate does not cover the whole Archipelago. The northern islands are in the German sphere of influence. But the Teutons have imposed such taxation, in the way of licence fees and export duties, that the traders in the British Protectorate have practically given up visiting the islands north of the line of demarcation.—*Scotsman*, June 10.

CACAO DISEASE.

MR. E. E. GREEN, who is naturally much interested in this matter, writes in answer to our enquiry:—

"As for the 'poochie' theory, neither my own observations nor any arguments brought forward by any correspondents, at all tend to shake my belief in the independent nature of the disease. But I keep myself quite open to fresh evidence and hope that personal examination in the various affected districts will settle the matter one way or the other. Mr. Van Der Poorten's argument in favour of the 'poochie' theory, is merely that 'the *dead* wood is full of beetles, and that they are often attracted in the large quantities by light.' This is extremely probable; but is as easily explicable by the fact that these boring beetles are always at-

tracted by dead and diseased wood, and if canker had been present on the estate for some time there would naturally be a large increase in the number of the insects which would have been freely breeding in the decaying wood bark."

Seeing that two or three kinds of "poochies are recognised enemies of cacao in Trinidad and elsewhere, it would seem not unlikely that Ceylon should be troubled with one or other in addition to "canker." But the attack on each estate should be the subject of careful inspection by the Entomologist.

COFFEE IN FIJI.

WE append a specimen of the glowing, but defective if not unreliable, paragraphs which find their way into the columns of inexperienced journalists in discussing products which they would fain see established and extended in their midst. We take the following from the latest *Fiji Times*:—

"A very handsome sample of Arabica coffee in parchment is on view at this office from the small estate of Mr. R. Morel, and has been much admired by connoisseurs, and pronounced by them equal to coffee grown in any part of the world. The grower says that his crop is a very prolific one this year, and will yield more than fifteen cwt. to the acre. This is a very exceptional yield, as five cwt. is considered a good average crop, although in some favoured places in Ceylon we have read of 8 to 10 cwt., but this was exceptional and not the rule. Mr. Morel's plantation is situated on an exposed portion of the coast, and is quite free of any disease."

In the first place, no mention is made of the area of "the small estate." To secure a crop of 15 cwt. from one acre or even up to 10 acres once in a way, would be no great feat if high or rich garden cultivation were resorted to; but that would, obviously be no criterion of what 100 acres treated in the ordinary way would yield. But we doubt Mr. Morel's estimate; and we are borne out by the opinion of a planter who knows Fiji well:—

"No reliance can be placed on the estimates made by the settlers there as they have never properly grown and cultivated coffee. The only two men I know in Fiji who could at present give a fair estimate of crop on trees are Dixon, who used to be on Kelvin, Dolosbage, in the old coffee days, and Geo. Drummond (an older planter than Dixon) and a brother of Gangwarily Drummond. These two know all about coffee and could give reliable estimates. The others only go by guess-work. I have often seen fields put down as bearing 12, 15, and even 20 cwt. an acre when at the outside they only had 5 to 6 on the trees and when laughed at have offered to back my opinion and invariably won. The same applies to leaf disease. Settlers will tell you there's not a trace of it on their trees, and on examination one who knows anything of *Hemileia vastatrix* can see it distinctly. Leaf disease is all over Fiji: this with dear and scarce labour, not to mention hurricanes, will militate against successful coffee-growing there."

COCONUT LAND IN THE SOUTHERN PROVINCE.—Mr. Wace in his Report for 1896 states that there is still a large extent of suitable land available for coconuts in his province. It ought to be surveyed and put up for auction sale in convenient blocks as soon as possible.

COFFEE PLANTING ON THE SHEVAROY HILLS.

(*From a Correspondent.*)

The Shevaroy Hills, which I visited early in June, after an absence of 30 years, give me the impression of having been asleep for those 30 years. Nothing seems to have altered. There is the same steep ghaut, impossible for wheeled traffic, there are the same old bungalows with some additions—there is the same diminutive lake which always looks half empty: there is a tiny Reading Room, which has not as yet developed into a Club, and there is a general air of drowsiness over the place. But Yercaud is exceedingly pretty notwithstanding. The air is cool and pleasant, a nice wind is blowing, and the hollow lanes fringed by flowering hedges remind one of the old country. In one respect some progress has been made, and that is in the extension of coffee cultivation. Almost all the land that has not been reserved by the Government has been taken up and planted out. Already half way up, at an elevation of about 2,000 ft.,

THE PLANTATIONS COMMENCE,

and improve the higher we rise. Once on the top of the hills, almost every compound is full of coffee bushes, and any one wishing to open out a new plantation must go a distance of 14 or 15 miles. At the time of my visit the coffee berries were all set after the second or April blossom. In a great many of the clearings the trees were perfectly loaded with crop, and on the whole I have seldom seen a finer show. Many points struck me as very different to the system of cultivation I had seen elsewhere, especially in Travancore, whence I had just come. In the first place, there seems to be very little virgin forest. There is a small piece still standing near the lake, known as the Sacred Grove, which shows what the virgin forest really was. The rest of the forest seemed to consist almost entirely of secondary growth, sprung up during the last 60 or 70 years. None of these trees are very large. What struck me first of all was the large amount of natural shade. From a distance, a hill side will have all the appearance of forest, but as you come closer you find that it is a plantation. Only some of the trees have been felled and the remainder left for shade. In Travancore they make a clean sweep of the whole of the trees, burn them and then plant out artificial shade trees. The next thing that seemed to me strange was

THE HEIGHT OF THE COFFEE BUSHES.

Instead of being topped at 3 ft. from the ground, most of them were about 6 ft. and some as high as 10 ft. In some places the trees had been coppiced and fresh shoots were springing up from the stools and bearing a good crop. One result of this system of growth seems to be that there is not such a show of leaf. In plantations where the trees are lopped 3 ft. from the ground, the branches spread out so as to cover the whole soil, of which in a well planted tote there should be as little to be seen as possible. Another thing that struck me as peculiar was the absence—with few exceptions—of estate roads and paths, which should make supervision difficult.

During my stay I visited several estates and made many enquiries from different persons. One great

ADVANTAGE OF THE SHEVAROYS

seems to be the mildness of the monsoon. There are no violent bursts as there are in Travancore. There is but little wind, indeed so little that the young plants are never staked, and it is owing to this absence of wind that there is no danger in allowing the coffee trees to grow higher than elsewhere. Instead of heavy torrents of rain lasting for several days together, they only get good showers every day, with breaks of several hours during the monsoon months and a fairly steady supply during the rest of the year. This has been a dry year, March and part of April especially so, but in May they had 9 inches

of rain, and when I was there, early in June, everything was looking fresh and green. The soil for the most part seems to be excellent, and owing to the number of cattle on the hills, and the nearness of the plains, manure is easily available, and the proximity of the railway makes the supply of fish and artificial manures less expensive than on the Travancore Hills. Manure is therefore extensively used and apparently with excellent results, for the average yield appears to be 5 cwt. an acre, and some of the estates which are 25 to 30 years' old show no signs of being exhausted. Leaf disease appears to be unknown or at all events in only a very mild form, and the grub gives no trouble.

FIVE CWT. AN ACRE

is a very good out-turn and at present prices should give a return of nearly R350 per acre, for Shevaroy coffee has a very good name in the market and realises good prices. But most of the estates are very small, and it therefore stands to reason that when the proprietor has to make a living out of it and maintain a house and family, there is not much left for the estate. A great many of these estates have also been opened out on borrowed money, and 10 to 15 per cent. interest accruing on a growing estate is calculated to saddle it, when it comes into full bearing, with a load of debt which it may take years to remove, and most likely ruin the proprietor in the end. It seems doubtful whether a system of small proprietors is calculated to properly develop a coffee country, because the cost of supervision falls with undue weight on a small estate. Supervision is generally calculated at the rate of Re. 1 per acre, and when this charge is distributed over an estate of from 300 to 500 acres it does not become an undue burden, but if the estate is only 50 or 60 acres in size this rate is not sufficient for the maintenance of the Superintendent. Whatever, therefore, is paid to him in excess is so much taken from what ought to be spent on the estate itself. This, therefore, would seem to account for the fact that with a favourable climate, excellent soil, cheap labour (3 as. per diem) and the vicinity of a railway, Shevaroy planters as a rule are not so prosperous as as one would expect them to be. Here again the Government seems to have done very little towards helping the enterprise. Only now, after more than half a century of planting industry, has it been decided

TO BUILD A CART ROAD,

and until that is made everything has to be carried up the ghaut by coolies. The only representative of the law on the hills is a Native Deputy Tahsildar, and there is no Bank or Government Treasury from which the planters can draw money to pay their workmen, &c. In this respect the Travancore Government has been more liberal and has appointed a European magistrate to exercise jurisdiction over the European planters of the High Range.

At the time of our visit

YERCAUD

was very full and rooms were not obtainable for love or money, unless ordered long before. It seems strange that with this annual influx of visitors so little is done to provide them with amusement. A couple of tennis courts and a diminutive reading room are scarcely sufficient. In Yercaud itself there are few unoccupied building sites available and where one can be found it fetches from R800 to R1,000 per acre. The great want seems to be water. There are but few streams which last throughout the year, in striking contrast to the Travancore Hills, where almost every valley has its little river. The stream which feeds the lake and flows down to the West, and another small river, the Vanniar, which rises near the Green Hills and flows to the South, appear to be the only perennial streams near Yercaud. This is a want which it is difficult to supply, for it is not easy to sink a well on a hill range. But every place must have its drawbacks and on the whole the advantages of Yercaud far outweigh its disadvantages. The scenery is charming, and the range of hills being comparatively small in extent, almost every hill top has a view over a wooded valley, with a glimpse of the low country beyond, dotted with gleaming tanks and patches of green cultivation. Its accessibility is also a great advantage, whilst the change of climate is not so abrupt as is that of Ootacamund. The hills certainly deserve more attention from the inhabitants of Madras and the expenditure of more capital in developing their resources.—*M. Mail*, July 1.

A TIN AND COFFEE COUNTRY.

THE CONFEDERATED STATES OF MALAYA.

[In these articles the writer chiefly describes Perak, one of the Malayan States, with its races of Malays, Chinese, and Sakais, or aborigines. The island produces five-eighths of the tin consumption of the world, and promises to be a fine coffee producing country.]

Hitherto the industries of Perak might have been described by the one word

"TIN."

This is no longer the case. The extensions of the railway and the improvement of communications, coupled with other causes, such as the depreciation in the value of tin, and appreciation of coconuts, coffee, and other tropical products, has brought agriculture and the development of the waste forest land very much into the foreground. There has been special progress in 1896, when the wealthy Chinaman, equally with the European, and often conjointly with him, began to invest in land, and once John has begun there is no telling when he may stop if tin does not rise above what is now considered rather a low price. The State at last has come to realise that, while it was consuming its capital in tin at a tremendous rate, it was doing but little to develop its very extensive forest land, exceedingly well suited for the growth of all tropical products.

COCONUT AND SUGAR PLANTATIONS

have been for many years carried on successfully in Province Wellesley, opposite Penang, and other parts of the Straits; and during the last few years the planting of coffee (Liberian) has advanced sufficiently to show that the soil and climate will produce this variety of coffee abundantly and of good quality. In Selangor there are already many estates established and producing, but in Perak coffee planting on any large scale was not gone into until within the last year or two, with the exception of two or three estates, each in separate districts. One of these, having a planted area of 250 acres in bearing, between six and seven years old, gave in 1895 a return of $6\frac{1}{2}$ cwt. of clean coffee for the market, and the extensions of a year or two old on same estate promise to do still better. These are the results in Perak. Other States have done as well, and the return is what may be ordinarily looked for. The leaf disease which destroyed the Arabian coffee in Ceylon is certainly present in Perak; but in the case of the stronger and more vigorous

LIBERIAN TREE

it has not hitherto done any damage worth speaking of, and it is the general opinion that with this variety of coffee the disease is powerless to do much harm, and may be discounted. Judging by the experience already acquired, and the results attained, I see no reason why the Malay States should not become extensive growers of the Liberian coffee tree, and make up for the million cwts. lost to British Colonial produce when the leaf disease wiped almost out of existence the Arabian variety in Ceylon.

Not a few of your readers have been, if they are not now, interested in coffee, directly or indirectly, and those may be curious to know how things are done in connection with coffee planting in Perak, where conditions are different from those that prevailed in Ceylon in the old palmy days. In the first place, the Government gives the land on

PERPETUAL LEASE

at an annual rental of half-a-dollar (little more than one shilling) per acre, and for every acre cleared and planted it allows a forest reserve of two acres

free of rent till it is required. There is besides an export duty on coffee of 2½ per cent ad valorem, that is, all the rent and taxes to pay. All imports, except wines and spirits, are free of duty. In fact the ports of Perak are practically free. The polite Malays do all the felling and clearing. It is gentlemanly work that can be done in their own way, and in the doing of which they can take their rest at will, and smoke their cigarettes as often as they like. Such freedom suits their lazy, lounging habits, and easy-going, sufficient-for-the-day disposition.

The more muscular and uncouth

CHINAMAN

follows. He cuts the roads and drains, and digs big holes for the coconut, and smaller holes for the coffee. The two products are sometimes interplanted, the one slow-growing, coming into full bearing in ten years; and the other quicker, giving crop in the third year, and being in full bearing in the fifth or sixth. The light work of making and tending nurseries, taking the plants therefrom filling the holes with good soil, and putting the plants therein, is, as a rule, done by the slim Indian Tamils, though the Malays are gradually getting into this work, and do a fair day's work when they can gather sufficient energy to compete with the Tamil, whom they despise.

THE WORK OF UPKEEP

of the estate is in Perak rather more expensive than in Ceylon, not so much from difference in cost of labour (which is as sixpence in the latter to ninepence in the former) as from the more rapid growth of weeds in a more forcing and at the same time more equable climate, much the same all the year round, with a mean temperature of 80 degrees, and a well-distributed rainfall averaging 120 inches per annum. There is never a day without sunshine, there is hardly ever a month without rain, though it does come down "a plumper" in some months more than in others, causing havoc to roads and to drains, of which many are required to meet these downpours, and so save damage by wash. The invariable sunshine, even distribution of rainfall, and absence of high winds are valuable elements in producing, ripening, and curing crop.

The disturbance of the soil to any extent in tropical lands gives out malarial gases, and fever results. For this the planter has to be prepared, and where there is a large charge he is often kept busy with his medicine chest, for there is no doctor or hospital within many miles, and fever treated quickly is as a rule fever treated successfully. The methods may be wrong and the doses strong, but the cooly has faith in his master and lives.

Both coconut and coffee plants have in their youth enemies. The boar from the forest brings a following into the plantation. His tribe have a sweet tooth for the young coconut, but are too wily to be trapped, so night has to be made hideous by tumtumming to make believe that high festival is being kept, and Mr. Piggy had better come another time. Then there come the pests to worry—beetles that have to be caught, and "bug" that has to be skotched. But in spite of all these and more, the coconut and coffee grow luxuriantly in the favoured clime of Perak. So much for the agricultural industry.—*Inverness Courier*, June 18. D.M.

THE DIMBULA VALLEY TEA COMPANY.—It is no wonder the shares of this Company have sprung up, after the glowing account of its position and prospects given in the "Limited Liability Review." There can be no doubt the Directors have behaved well by the shareholders in paying them quarterly dividends and if they can complete the 10 per cent and show earnings equal to 15 for their first year,—they will deserve all that is said of their success and good management.

THE AMSTERDAM CINCHONA MARKET.

Our Amsterdam correspondent gives the following particulars with regard to last Thursday's sale, of which the result was announced shortly in our telegram last week: The cinchona auctions were very quiet all through, contrary to the general expectation. It is quite evident that the combined manufacturers were determined to keep down the price and to abstain from buying rather than raise the unit. The consequence of this was that the largest buyer, who generally has speculative orders in addition to those for his factories, was able to obtain one-third of the quantity offered without advancing the unit above 4·20c., against 4·10c. at the last sales. The unsold parcels are held for 4·50c. per unit. There is some idea that the quinine-makers' attitude is meant to frighten second-hand holders here (who hold about 18,000 packages) into accepting the small profit that the present unit would yield most of them, but it is not likely that any will be tempted. The richest parcel of bark in the sale was one of 20 bales of crushed *Ledgeriana*, analysing 8·51 per cent. This realised 36c. per half-kilo. *Druggists'* bark were in good demand at higher prices. This applies especially to broken quills and *Succirubra* chips and dust, which realised a unit of about 7c. Fine quills also found ready buyers, but medium varieties are quiet. We understand that, since the sales, bids have been refused on the basis of the sale-prices for several lots bought in at the auctions. —*Chemist and Druggist*, June 19.

THE DIAMOND JUBILEE OF INDIAN TEA.

As it is customary to recall just now the important events of the reign, it should be remembered that the Indian tea industry has flourished about as long as the Queen has reigned. The year 1837 witnessed, we believe, the first experimental efforts at tea growing in Assam, and it is needless to point out the developments which have followed. Tea has been cultivated in China for 2,000 years, in India but 60, and in Ceylon but 20 or so; and in the latest report by our Consul at Kinkiang he tells us "China teas are undoubtedly giving way more and more to teas from India and Ceylon." As for the consumption of tea, the increase during the Queen's reign has been extraordinary. Until three years before Queen Victoria came to the throne the tea trade was monopolised by the Dutch East India Company, and although we had tea in England as long ago as 1610 we were comparatively small tea drinkers before the present reign. Not the least significant feature of the Victorian era is this, that during it we have become the largest consumers of tea in the world. The United Kingdom itself consumes in the aggregate nearly as much tea as all other civilised countries combined.—*H. & C. Mail*, June 18.

EXTRACTION AND PREPARATION OF TALC.

Talc is extracted on a large scale from the granite mountain of St. Barthelemy, in the French Department of Arriège, about 32 kilometres (20 miles) from the main chain of the Pyrenees. The principal quarry, at Tremouin, is worked open-cast in three banks or terraces, each about 15 metres (49 feet) high. The best rock is of a bright white tint, and feels greasy to the touch when reduced to fine powder. The quarried rock is brought by a tramway to the end of the quarry in the Axiat Valley, and then by wagons for a distance of 19 kilometres (11 miles) to Luzenac, where 90-horse water-power is taken from the Arriège river. The mechanical preparation consists of drying in a rotary oven, breaking up small, grinding and sifting, the grinding being effected in mills with steel balls. The larger portion of the product, observes an Ingénieur des Arts et Manufactures, who has communicated these particulars to the *Chronique*

Industrielle, is converted into powder, only a small portion being sent away in the rough state, or cut into pencils for writing on metals. Besides its use throughout most parts of Europe and America, in soap and paper-making, talc enters into the composition of wagon-axle grease, while it also serves as an insulator for electric conductors.—*Journal of the Society of Arts*, June 18.

COFFEE PLANTING IN THE HAWAIIAN ISLANDS.

The cultivation of coffee in the Sandwich Islands is as yet in its infancy, but it has made such strides of late years that hopes are confidently entertained by the local Government that the industry will soon be placed upon a sound and important footing. It is said by Consul General Hawes, in a report that was received, lately by the Foreign Office in London, that the situation in Hawaii is (according to Mr. Charles Metcalfe, a planter of great experience in Ceylon and the islands referred to,) very similar to that of Ceylon * in the early days, when, owing to the want of experience, plantations were opened out in unsuitable locailties, and when, owing to the neglect of considerations of soil or elevation, much money was lost, and the industry was brought into undeserved discredit. Conditions as to the labour supply, the distribution and amount of rainfall, the nature of the prevailing winds, and the range of the temperature, have to be studied at Hawaii as elsewhere. The soil is of volcanic origin, and is extremely rich and fertile, as Miss Isabella Bird long ago stated in her charming narrative entitled "Six Months in the Sandwich Islands." There is a vast area of land at elevations of from 500 to 2,400 feet that is believed to be admirably adapted for coffee, and only a small portion of it is under cultivation. The general lay of the land is westerly, so it commands plenty of sunshine. The rainfall is heavy, and varies from an annual average of 75 to one of 200 inches. The seasons are fairly regular, and they are favourable to coffee, as they insure the proper tetting of the blossom, they facilitate pruning operations, and they furnish ample water for pulping and washing. The temperature rarely exceeds 85° in the shade. The Hawaiians being a self-indulgent and unreliable race do not make good field-labourers, and planters greatly prefer Japanese and Chinese when they are to be had. But immigrants from Japan and China are not as yet very numerous. The feeling of planters is strongly in favour of the monthly free-labourer; but the supply of suitable men is small and precarious. Contract labourers usually receive $12½, and free labourers $15 a month —rates which compare unfavourably with the scale of wages in force in Ceylon. On the other hand, the making of roads is not costly, owing to the easy gradient of most of the land. Then the coffee tree in Hawaii gives a yield greatly in excess of that of Ceylon, where a return of 672 lb. per acre on an average is considered a very good crop, whereas in the Sandwich Islands a yield of 1,000 lb. may, it is stated, be reasonably expected, or at the rate of 1 lb. per tree, which may be increased to 1½ lb. to 2 lb. by pruning and fertilising. The country is being covered by a network of fine carriage roads, which will greatly facilitate transport. Harbours on the western coast are numerous, and the landing places are available for almost the whole of the year. One District, called Kona, is peculiarly favourable to coffee, for it is blessed with perpetual calms, rich soil, a moderate rainfall, and regular season. The coffee grown there gives the large proportion of from 12 to 15 per cent. of pea-berry of fine quality.

Mr. Hawes quotes an estimate of the cost of establishing and maintaining a coffee plantation of 75 acres from the first to the seventh year. The purchase of 100 acres of Government land will cost $1,000. The Manager's salary is set down at $1,200 a year. Six Japanese are employed in the first two years, nine in the four following years, and twelve in the seventh year. The estate should give 20,000lb. of coffee of the value of $3,600 in the third year; 60,000 lb., of the value of $10,800 in the fourth year; and 85,000 lb., of the value of $15,300, in the fifth year. This will suffice to clear all the working outlay up to date. This sixth year is calculated to yield 100,000 lb., of the value of $9,985; and the seventh year 125,000 lb., of the value of $11,680. At the end of the seventh year the balance at the credit of the plantation should it is said, be upwards of $21,000. The above yields are stated to be far below what may be attained by thorough cultivation and fertilising. The estimates were compiled by the local Commissioner of Agriculture, and Mr. Hawes says that they may be relied upon as correct. He adds that fairly good coffee land can often be leased in the islands from private individuals at from 2 to 4 dollars per acre, for terms varing from 20 to 25 years, and that this method of obtaining land does not necessitate the holder becoming a denizen of the country.—*M. Mail.*

* Mr. C. Metcalfe, we feel sure, cannot recall the early days of Ceylon? We have no volcanic soil which makes a big difference, but Dumbera often gave over 1,000 lb. per acre of coffee.—ED. *T.A.*

LEASING OF VIHARE LANDS.

A correspondent enquires:—"Do you know if there has been an extension of time for leasing Vihare lands allowed? I have an idea that there has been a Minute sanctioning leasing of such lands for 50 years. Can you say if I am right? Without such an extension few people would care to have such lands, at any rate for any permanent product such as coconuts."

Under the provisions of "The Buddhist Temporalities Ordinance 1889 and 1895," the Trustee of a Buddhist temple may with the sanction of the Provincial Committee, and for such rent and subject to such conditions as they shall deem reasonable, lease for any term not exceeding 50 years, all or any of the lands vested in him; provided that whenever a Trustee shall, with the consent of the Provincial Committee, be desirous of leasing any land for a period of more than 20 years, the sanction of the District Judge of the District in which such land is situated, shall first be had and obtained by him for that purpose. There is no later regulation that we are aware of.

GOOD OLD TIMES.—In the good old days of China tea some sixty years ago, the duty was 2s 1d per lb., and the range of prices per lb. in bond was as follows: Bohea 2s 10d, Congou common 1s to 1s 4d, strong 1s 6d to 2s, Pekoe kinds 1s 10d to 2s 8d, Souchong 1s 1d to 2s 1d, Caper 1s 1d to 1s 5d, fine Orange Pekoe 2s 6d to 3s 6d. The retail price of tea ranged in 1837 from 6s 4d to 14s. This was of course before the days of Indian tea. To those who remember the difficulty experienced over twenty years ago in procuring Indian tea from the shop of the tea retailer the following passage from the last issue of the *Grocer* shows the changes brought about by time. "As China is now making strenuous efforts to assimilate her produce to that grown in India and Ceylon, it becomes," says the organ from which we quote, "all the more necessary for British planters to turn out tea of extra good quality; for it is the undoubted excellence of their productions, adapted to the peculiar tastes and made to suit the palates of consumers at home, that has enabled them to achieve so signal a victory over their Chinese rivals as has been shown for many years past, and it is to be hoped that nothing on the part of the British tea-growers will be left undone to preserve their old reputation for successfully building up a gigantic industry, and thus maintain the prestige of their favourite product."—*H. & C. Mail*, June 25.

SCALE PESTS (ON COFFEE ESPECIALLY) AND LADY BIRDS.

At the last Annual Meeting of the U. P. A. S. I., attention was called to the success which had attended Professor Koebele's attempts to combat the scale pests which destroyed the Coffee plantations in Hawaii, and a Resolution was passed asking the Madras Government to communicate with the Commissioner of Agriculture, Hawaii, with a view to securing the services of Professor Koebele for a short period for the purpose of investigating the insect pests which attack coffee in Southern India. The Madras Government undertook to do this, and in a letter to the Commissioner of Agriculture, Hawaii, asked for information on the following points :—

(1) as to the results obtained from the experiments which have been conducted.

(2) as to the approximate cost obtaining a consignment of lady birds for experimental purposes in Madras and the source from which to procure such a consignment, and

(3) as to whether Professor Koeble could arrange to visit Madras for a short period for the purpose of investigating the insect pests which cause damage to coffee in the Madras Presidency.

Should Professor Koeble consider such a visit to be practicable, what salary and allowances he would consider sufficient remuneration for his services and on what conditions he would undertake the visit.

The following is the reply received from the Commissioner of Agriculture and Forestry, dated Honolulu, 3rd March, 1897, and the Government Order thereon :—

Your communication, dated the 14th November, 1896, in which you make certain enquiries concerning the entomological work of Professor Koebele was duly received. I have delayed answering your letter until I could communicate with Professor Koebele who had departed from these islands on a mission to Mexico and Central America, in search of beneficial insects to send to this country. I can offer you no encouragement that Professor Koebele's services will be available for the Madras Government, at least for two or three years to come, as he is under an engagement to this Government and to the Hawaiian Sugar Planter's Association, each paying one-half of the salary and expenses. The salary paid to the Professor is $3,000, or six hundred pounds sterling per annum and all travelling expenses. Your first question, as to the results obtained from the experiments which have been conducted, I beg to answer as follows:—Before the engagement of Professor Koebele, the vegetation of the Hawaiian islands was sorely infested by numerous coccids or scale insects, which were so destructive that any industry, except sugar growing, seemed impossible. Particularly were the coffee trees infested with a terribly destructive scale insect (Pulvinaria psidii). The tree could not ripen its fruit, the berries turned black and dropped off long before they became ripe. Tetranychus telarius (red spider) was also present as well as several other destructive scales infesting coffee trees. The outlook for the coffee planter was gloomy indeed, and no one had the courage to start a new plantation and it seemed but a question of a short time when the industry would cease to exist in this country. Now, all is changed, the coffee trees are free of scale pests and blights, and new plantations are being started all over the islands. This wonderful change has been accomplished by the introduction in this country of the natural enemies of the scale pests that were present. The work of finding these natural enemies and sending them to this country was entrusted to Professor Koebele, and well has the work been done. The Professor has sent us beneficial insects from California, Australia, Ceylon, China and Japan and these keep our vegetation practically clear of scale pests. The Professor is now on a mission to find and send to us parasites and beneficial insects for cut-worms and caterpillars that are injurious to sugar-cane, pastures and garden produce.

Question (2) as to the cost of obtaining a consignment of lady birds for experimental purposes in Madras and the sources from which to procure such consignment—The cost of such a consignment should be but trifling—an experienced collector can collect many hundreds of lady birds in a day. The method of packing them for shipment is to place the lady birds in small, practically air-tight wooden boxes, in which some slightly moistened moss has been placed; the boxes should then be wrapped in oil cloth so that no outside moisture can penetrate to the boxes. In order to safely carry the lady birds on journeys of over one week's duration, they must be carried in a temperature of between 30 and 40 F., this temperature can be found in the cold storage or ice room of all passenger steamships. If transhipment from one steam ship to another is required on the journey, a trustworthy agent should be on hand to make the transhipment without delay, for if the lady birds are once thawed out it is fatal to make them cold again. In this manner they can be safely carried on journey's occupying from one month to six weeks. As to the source from where to procure the lady birds, I am afraid that my advice will be of little service to you as I am not familiar with the coccids or scale insects affecting the vegetation, of Madras, if there are any of the Dactylopids present, the *Cryptolaemus montrouzeri* will surely feed on them. Australia is the nearest country that can furnish that valuable lady bird as well as many other useful coccinelladae. China and Japan also have many indigenous species, some of which have proved of great value to these islands. I would strongly advise against the wisdom of relying on the importation of one or two shipments of lady birds and judging from the effects of these importations as to what can be accomplished in this branch of applied entomology. There are over 1,700 different kinds of coccinelladae or lady birds catalouged and probably many hundreds yet undiscovered, and all are, with very few exceptions, coccid or scale feeders, some such as the vedalia cardinalis will feed only on one scale, while others as the *Croptolaemus* will feed on several. In order to obtain the best results, all counties within reach of a month's or six weeks' journey, should be explored for the beneficial insects they can furnish, and the work should be entrusted only to a skilled entomologist, one who has made the life habits of beneficial and injurious insects a special study. While all countries have their beneficial insects, they also have those that are injurious, and if the work of collecting is done by a person not thoroughly competent, injury instead of benefit might result.

As to whether Professor Koebele could arrange to visit Madras for a short period for the purpose of investigating the insect pests which cause damage to coffee in the Madras Presidency—In reply to this question I beg to say that I have communicated a copy of your letter to Professor Koebele and in reply he writes that he feels himself bound to the service of this country as long as we may require him. I am about to visit the United States and shall be absent from these islands for three months. During my trip I shall visit some of the United States agricultural experimental stations and shall meet several entomologists of established reputation; among them I may find one who would be willing to undertake the work of searching for and introducing beneficial insects to Madras; should you desire to learn the result of my enquiries I shall be glad to send the same on receipt of a request from you. Order—No. 351, Revenue, dated the 18th May, 1897.

Communicated to the Hon'ble Mr. H. P. Hodgson:

The following letter acknowledging the receipt of the second of the papers read above and stating that the question of employing an entomologist from the United States cannot be decided until after the receipt of definite proposals from the Planters' Association, will be sent to the Commissioner of Agriculture and Forestry, Honolulu.—*M. Mail*, July 3.

ABYSSINIA : THE WASTE OF A WONDROUS LAND.

COFFEE AND CACAO AND "NUWARA ELIYAS."

(BY G. W. WARD.)

Harrar, May 4.

Idling here, in the midst of a luxuriant plantation, whose groves of coffee, and cocoa, and semi-tropical fruit-trees innumerable, separated by acres of sugar-cane and maize, pepper, cotton, and tobacco, are sun-lit and noisy with a host of birds screaming, trilling, belling, cooing—it is easy to understand that I do not envy you who read.

Imagine an undulating region clear of jungle, for a long day's ride in any direction, blessed with a perfect soil, innumerable streams, game in just sufficient abundance, and willing labour at hand; imagine hundreds of square miles of soil capable of growing anything from an orange to a cabbage, so friable that a cat might draw the plough almost, and needing ten sickles where one hoe has been plied; picture to yourself such a land, if you can, and then mourn the fate of Harrar province.

I have spoken of the weary desert that lies between here and the Red Sea-coast; I have outlined the faintly-disguised designs of French politicians in regard to Harrar, and the unpardonable policy which led to the abandonment of this Eden by England when the Soudan was about to be evacuated; let me now utilise one of the many long hours that must be spent lazily, awaiting Menelik's passport to the beyond, in shortly describing the lost garden-land of north-east Africa—the paradise that an Englishman flung away fifteen years ago.

In all there may be thirty plantations around Harrar, though that is but a thousandth part of the possibilities. All practically were

CREATED DURING THE HALF-CENTURY

of Egyptian rule which England interrupted. They range in size from 200 to perhaps 2,000 acres. When the Abyssinians made the Galla country their eastern-most colony—which they did very promptly after the evacuation—they found Harrar and many of its gardens ready-made. Being beef-eating, mead-drinking warriors, like so many modern Norse men, they disdained agriculture, and (slavery being interdicted) but slightly appreciated the new-found treasure. A large proportion of the cultivated ground was therefore generously presented to the Greek and French community during the succeeding ten or twelve years. Here where I write, and all as far as I can see from this hill-side, was so given, by Ras Makonnen, in consideration of such valuable services as the dismounting a mitrailleuse, steady attendance for some weeks at his durbar; submission, uncomplainingly, to unjustifiable arrest by over-zealous soldiers; and things of that sort. The result is the extraordinary spectacle of almost the entire environs of the eastern capital of Abyssinia held by foreigners who mostly keep little grog-stores in town, know nothing of farming, and use the land chiefly as a place of recreation for Sunday outings. The only serious attempt at development is being made by a Cretan—the only man, too, who possesses title-deeds, and who, nevertheless, privately notified me that, if I excited the suspicion of the Ras by again applying for leave to visit his land, the land would probably be summarily seized,

WITHOUT ANY RED-TAPE BOTHER

about title or improvements. And he has spent some £5,000 on the plantation, mind you!

The richest soil in all Abyssinia, almost without a stone or a weed; with plentiful water and all the labour one wants at 6d a day; with no apparent foe or obstacle but wild animals and the long desert which lies between this and the sea—putting aside the insecurity of tenure under Abyssinian administration—it is an hourly marvel to me how England permitted such a territory to be thrown away, needlessly. Why—knowing nothing of planting, following primeval methods that an East or West Indian colonist would sneer at, the favoured landowner I have referred to draws already some 12s net from each of his thousands of coffee-plants annually, not to speak of the other revenues from the great garden. And he hardly knows coffee when he sees it, and has no idea what to do with his cacao! His neighbour on each side is a store-keeper. On the hill opposite is the ground of a watch-maker. Fancy—only fancy!—what estates producing easily their £7 and £20 an acre annually, under the slipshod management of this batch of incompetent, insecure, indolent Greek and Armenian traders, might be worth in the hands of substantial, energetic, British colonists. who could rely on their titles being respected to an extent which no Levantine can in this despotic land.

I have seen the gardens of the Far East, and few could surpass in fertility these which encircle Harrar, given the same care. That this place is

UNKNOWN AND UNEXPLOITED

is easily explained: it would have been far less difficult to have obtained Ras Makonnen's leave to go a hundred miles in any direction, shooting, than to spend a few days of leisurely espionage in this Mount Pisgah.

This is not Abyssinia. It is hardly an Abyssinian colony. It is a derelict Paradise that Menelik has seized. Ten years ago it was his boundary. Today the frontier of Ethiopia is a hundred miles nearer the coast, and two hundred southward. The frontier is spreading, extending always, in whichever direction one looks. Your very latest London maps do not show it, by any means, or the believers in the eventual partition of Africa among three or four European

POWERS WOULD BE ASTOUNDED.

Even here the present boundaries are not known definitely. The western side is an enigma—the south a puzzle. South-east our sphere of influence is already invaded, and north-east Italy is limited once more to Erythrea. And Menelik has just ordered thirty Krupp cannon and a dozen mitrailleuses through a French agent. What does all this indicate?

Have I made the situation clear (to some extent, at least) in my later notes from this eastern gate of the leading North African independency? Fertile, rich in minerals, healthy, on the one side; governed in a mediævally barbaric style, with a dash of Thibetan exclusiveness; either the likely prey of a rival Power whose only interest is a foot of sandy beach at Djibouti, but who is avowedly to establish herself nearer the Nile source, or, if Britain misses her opportunita, a formidable obstacle against the spread of real civilisation beyond Khartoum if left independent—Abyssinia must be kept in view by our Foreign Office. To make her an ally will be a mistake—even the Little Britain party must see that her "protection" must inevitably follow the re-opening of the Soudan. And among other things British influence here will mean a dozen Nuwara Eliyas to our countrymen.—*Daily Mail.*

THE INDIAN TEA ASSOCIATION.

At the sixteenth annual meeting of this Association held at the Bengal Chamber of Commerce on the 16th June, the Chairman (Mr. G. A. Ormiston) in the course of his opening address referred to several important matters. One of the first subjects touched upon was the work of the Darjeeling and Dooars Sub-Committee and satisfaction was expressed with regard to the outcome of representations made in regard to the waste land rules and leases. Road communications in the Dooars do not seem to have advanced, but the Bengal Government has sanctioned a comprehensive scheme. Railway extension in that District is also much needed and Government is giving consideration to the question. As to the development of Assam it is pointed out that in that Valley alone it is estimated that the cultivable waste land is 6,700,000 acres not including the enormous tracts of reserved forests. The area

allotted to tea estates at present is 1,672,000 acres and so far as the Chairman can gather there does not seem to be any prospect of the waste land being brought under cultivation by the indigenous population. Alluding to the labour difficulty be argued that facilities must not be given whereby coolies would be enticed from the gardens, and that immigrative population brought in to cultivate these large tracts must be imported from other provinces, and not be drawn from tea. Government must take protective measures against famine, and look to a wide distribution of the population of congested districts, and Assam provides a large field for cultivation, and would add considerably to the revenne of that province. Subsequently reference was made to the interest the new Chief Commissioner is taking in the development of the Province, Mr. Cotton has journeyed through the whole Province, including Cachar and Sylhet, and if the many railways, tramways and communications are carried out in the way he desires, they would soon see the Province one of the most important and flourishing in Her Majesty's Dominions. Mr. Cotton has brought forward most prominently the necessity of branches of the Association being located in all distircts, viz., Sylhet, Cachar and Assam, and that they ought to be in direct and constant communication with the Tea Association in Calcutta. In regard to the labour question, Mr. Cotton has given on behalf of the Assam Administration his full support to the scheme for the establishment of a Central Recruiting Agency, and expressed the hope that all interested would combine to make it a success;

In regard to the American Market Fund and Foreign Tea Committee it was stated that the results of the continued efforts being made in America by Mr. Blechynden, in conjunction with Mr. Mackenzie on behalf of Ceylon, could not but be viewed with satisfaction and it is added that it is desirable that every one interested should contribute their share towards the general interest, at the rate of four annas per acre on the area under cultivation, and half an anna per maund on the production. It is not laid down that the whole of the Fund will be spent in America as the American and Foreign Tea Committee would be prepared to support efforts to extend new markets in Russia, South Africa, and other places. In addition to these there is hardly another country which has not participated in some degree in the introduction of tea, and there are signs from all quarters of increasing consumption, to meet which, together with the further expansion at home, the additional production from India and Ceylon should not prove excessive. Thankfulness was expressed for the cordial co-operation of Ceylon in carrying on the good work in connection with the Indian representative in America, and the Chairman had no doubt that their united efforts will be crowned with success

Mr. Blechynden attributed the slow progress of consumption there to the unwillingness of large firms to deal with Indians composed of small breaks, and, therefore, favour the facilities in handling long lines of China and Japan tea, but the Americans would, no doubt be able to adopt a remedy, and bulk themselves as is done at home. After a reference to the price of tea in Russia making the price prohibitive to the masses it was stated that it does not appear that we should fear so much from any change China and Japan may make in their mode of manufacture by the use of machinery, nor by the reduction of import duty at home, but from the unnatural state of onr currency giving our Eastern competitiors a most important pull over us at present.

It is computed that the total acreage now under tea, both in India and Ceylon, is not far short of 800,000 acres, two-thirds of which is in India. With regard to the reduction in duty on tea at home it is stated that it has had the desired effect, and there is no reason to doubt that a further reduction will not result even more favourably to India, and they must get every assistance to be relieved of the additional outturn, which must be expected from the increased area coming into full bearing. With regard to the bulking of teas it was stated that there should be a clear understanding come to, and although he had read a recent notice that the London Docks had plenty of space, and would give any further accommodation required for the increased importations to bulk a larger proportion of tea in London, they should ask the Committee of the London Association to look carefully into the matter, so that gardens might know what was best to done under the altered position recently suggested. In regard to handling of packages at the Tea Warehouse and Jetties, it was satisfactory so far to know that the Special Committee appointed to inquire into the treatment the tea had to undergo while in the hands of those they entrusted with their care, had had good effect, and he would only suggest to the next General Committee, not to relax their vigilance in seeing that the tea received every care in handling. After allusion to the necessity for an improved tea chest and the appointment of an agricultural chemist, it being stated that if the tea bush receives proper treatment here can be no reason to doubt but that the plant will be long-lived, mention was made of the value of prizes for individual research. Reference was next made to the prospect of a Planters Ward in the general hospital and the necessity for a Pasteur institute. From the annual report we quote as follows:—

At the time the last report was written, the General Committee had just issued a circular calling for further contributions on the same basis as in the year 1895. In that year tho sum of R92,545 was contributed, representing a production of nearly 80 millions of pounds of tea, and including liberal contributions from the two Planters' Associations in Travancore, which have always evinced a practical interest in the efforts made to exploit the American market. The result of last year's circular has been still more successful, as the amount subscribed was R1,03,674 8-0, or an increase of about R11,000 upon the previous year. This included, as in the previous year, contributions from Travancore, and the increase was due to a special effort made by the Committee to induce gardens, which had hitherto held aloof to subscribe. The Committee do not feel that it is necessary to remark at any great length on the features of American campaign as carried on during the past year, as the Amorican and Foreign Tea Committee in London issued an *interim* Report in February last, accompanied with copious extracts from Mr. Blechynden's Report for the year 1896, both of which have been widely circulated, and are also included in the Appendix. It will suffice to say that Mr. Blechynden, the representative of the Association, has continued to work vigorously in conjunction with Mr. Mackenzie, representing Ceylon, although their efforts this year have been carried on upon somewhat different lines, which are fully touched upon in Mr. Blechynden's Report. Advertising has been resorted to on a much more extensivs scale than ever before and the system of giving subsidies, or grants-in-aid, was also established on a regular basis early in the year.

These subsidies were fixed, as a rule, at one fourth of the amount each firm was itself prepared to expend on advertising, demonstrating and otherwise pushing its own brands of Indian and Ceylon teas, and Mr. Blechynden points out that it would have been practically impossible for him by his own efforts, to have covered the large area worked during the year by subsidised firms at Food Shows. Bazars and Grocery shows Mr. Blechynden has also done considerable amount of travelling, both in the States and in Canada, and has again made use of the varied means of bringing British-grown teas before the American public which are now familiar to anyone connected with the tea industry. The Committee in London have decided—and in this the General Committee here agree with them—that bearing in mind that the present year's crop, both for India and Ceylon, is again likely to show a substantial increase, there should be no relaxation made at present in the efforts which have hitherto been rewarded by so much success, and a circular has accordingly been issued, asking for further contributions on the same basis as last year, viz., at the rate of four annas per acre on the area under cultivation, and half an anna per maund on production. The Committee trust that the present levy will show a still larger amount of subscription than the last, and that many of those who reap the benefits of the efforts made but who have not hitherto subscribed will send in contributions. The usual statements of accounts are annexed to this Report, showing receipts and expenditure in Calcutta, London and America.

A SCIENTIFIC OFFICER FOR THE TEA DISTRICTS.

The Committee regret that the proposals in connection with this matter, which was referred to in the last Report under the head of "Mitigation and Prevention of Insect Blights," are for the present in abeyance. On the 15th June 1896 the Committee issued a Circular to members, which summarised what had been done up to that time and asksng for the views of members at an early date. The Committee were specially anxious to ascertain whether the project was likely to meet with a sufficient amount of support to warrant them in making an appeal to the tea industry generally for the requisite funds. The matter was also referred to the Committee of the Association in London, and was brought before their members at their Annual Meeting, at which it was found that there was a considerable divergence of opinion among members as to the advisability of going on with the project, the importance of which, however, was generally recognised. Reference is also made to the prospects of trade in Persia and Afghanistan.

The following information was supplied by the General Committee to the Secretary to the Chief Commissioner of Assam for insertion in the Annual Report on tea culture :—

		As.	P.
Avg. price per lb. of Assam Valley tea in	1896	8	3
,, ,, ,, Surma ,,	1896	6	10

		lbs.
Outturn of tea in Assam Valley in	1896	61,155,793
,, ,, ,, Surma ,,	,, 1896	47,000,973

These figures show an increase of about four millions of pounds in the production of the Assam Valley and of about six millions of pounds in the production of the Surma Valley.

The total planted area represented by the Association during the year is 275,445½ acres. This shows an increase of 10,307½ acres on the previous year, but the total area under cultivation is still a long way from being reached. The year's subscriptions at the rate of one anna per acre amount to R17,215-5-6, of which, however, only R16,219-12-6 were realised up to the 28th February, and, consequently, only this latter amount can be included in the accounts, the balance, however, having since been paid. The revenue account, notwithstanding the increase in the amount of the monthly contribution to the Chamber, shows a surplus of R2,139-7-10, and the Committee had a balance in hand on the 28th February 1897 of R17,926-4-7 less sundry liabilities amounting to R1,584-5-9. The Committee remitted to the London Association on account of the expenses of the London Office the sum of £200, the equivalent of which, R3,141-1-8, is debited to the revenue account, and has been provided, as usual, out of ordinary income.

We have next to refer to the speech made by Mr. H. D. Ashton in moving the adoption of the report. Amongst other interesting facts he mentioned that in the previous year the tea crop within what he described as the jurisdiction of this Association, amounted to 100,000,000 lb. more than in 1881-82 when the Association came into existence. When he examined the expansion of the Association as apart from that of the crop as a whole, the result did not appear to him so satisfactory In 1881 the crop was returned as 47 millions, in 1896 as 148 millions; in 1881 the Association membership represented 103,000 acres; in 1896 275,000 acres, and he was told that the acreage under tea in Northern India last year might be estimated at 400,000. Taking this as correct they got an average out-turn of 370 lb. per acre, and applying that figure to 1881 there must have been 127,000 acres under tea to produce a crop of 47 millions. Therefore in 1881, 103,000 acres out of 127,000 supported the Association, and in 1896, 275,000 out of 400,000. Thus in 1881 about 82 per cent. of the whole acreage subscribed to the Association and in 1896 only 68 per cent—not a satisfactory circumstance. He was aware that these figures were only a rough estimate, but they indicated at least that the Association had not expanded so rapidly as the Indian Tea Industry, and as he was of opinion that the work of the Association was thoroughly representative and goes to benefit the industry as a whole, he was necessarily also of opinion that those gardens which did not subscribe were evading their share of a burden that should be borne by all,—this being due to some misapprehension as to the objects and scope of the Association. Labour questions were only a part of the work of the Association and that work increased rapidly year by year in quantity and variety.

In supporting this motion Mr. G. G. Anderson referred to the efforts made to exploit the American Market. The past year's operations were, he was of opinion, distinctly encouraging but they must be unceasing to give their produce a firm hold on the American Market. The campaign must be carried on vigorously, as they had an energetic and enterprising competitor to contend with and one who had not only had for years the command of the market, but who was evidently prepared to go to some considerable monetary sacrifice to maintain the monopoly so long enjoyed. Vigorous efforts would have to be made to maintain and consolidate their position in America, not to mention extending their operations in that country and he could only hope that the further levy which had been called would receive the most favourable consideration of all concerned. The total shipments to Great Britain last year amounted to 132½ millions lb., and the quantity available for shipment this year was estimated at 138½ millions lb. and as similar increases might be expected yearly, he was afraid that, unless fresh fields were opened up, they would have to face a surfeited market in the near future. The speaker then proceeded to advocate the Central Agency Scheme for the supply of labour.

The Labor question had been receiving the attention in Government, and amongst other suggestions the peopling of Assam by the surplus population of other Provinces was one deserving of very serious consideration. The Hon. Mr. Turner referred to the handling of tea at the jetties and warehouses and pointed out how difficult it was when coolies had the handling of packages, to make them use that care they should use, and it was only by putting on extra European supervision that this could be done. That had been done and he thought with satisfactory results. A resolution was unanimously carried that the rate of subscription for the current year from each garden belonging to the Association should be one anna per acre under cultivation.

EXPERIMENTAL AND BOTANICAL GARDENS, ANURADHAPURA.

I was agreeably surprised to find cacao doing so well in the gardens. The conductor, Mr. Gooneratne, tells me that last year he gathered the largest crop.

The oranges have done fairly well. From the garden I have distributed both in the town and amongst the villagers on my circuits jak, Liberian coffee, cacao, and other plants.

A larger number of fruit trees should be grown for the free distribution amongst the villagers; it is useless to expect payment, for the villagers will not buy plants. Free distribution will, I feel sure, do good, and I fully endorse what Mr. Nevill stated in his report for 1893:—

The gardens here, if to be of any use to the Province, should introduce and test the varieties of well-known fruit trees and vegetables grown elsewhere or in Ceylon as well as introduce new kinds. Little nurseries should be made of trees useful for food or affording by profit or luxury an incentive to careful home culture by the peasantry. Soursops, pomegranates of better quality than now exist, oranges, limes, even country damsons, uguressa plums, West Indian papaws, and all such fruits could be sown on small plots of ground for distribution to the villagers.

The eucalyptus trees are doing well. The mahogany trees in the town look better than they did since I had them manured, and I daresay the extra amount of rain last year has helped them. There are some very fine mahogany trees in the Government Agent's grounds, so that it is fully established that this tree will thrive here.—*Mr. Byrde's Ad. Report* for 1896.

CACAO CULTIVATION IN CEYLON.

THE HARDIER KINDS AND AN EXPERIMENT IN GRAFTING SUGGESTED.

MR. E. E. Green sends us the the following interesting note:—

"There seems to be little doubt but that the red variety of cacao is less suited to our climate than the Forastero stock which has a more vigorous growth and resists to a great extent all diseases and blights. Agriculturists all over the world seem to be turning their attention more and more to the cultivation of disease-resisting varieties of plants. In this connection you should note Prof. Marshall Ward's remarks in the last number of *Nature* (June 10, 1897, p. 122, lines 14 to 33). It would also be interesting to try the effect of grafting the more delicate 'red' on to the hardier 'yellow' stock."

From *Nature* we take over the following portion of Prof. Marshall Ward's review of a book on the "Diseases of Plants," by Dr. Tubeuf, which is given the first place in the weekly scientific journal:—

One of the most striking and important features in this new book is the far too meagre note on "selection of hardy varieties"—the word "hardy" does not accurately translate the original. From all sides we are now hearing that different varieties of vines, potatoes, wheat, etc., show different disease-resisting powers, and Tubeuf says, "An important method for the protection of plants from disease . . . consists in the selection and cultivation of varieties and species of plants able to resist the attacks of parasitic fungi."

The very brief account of what has done with the vine, and the reference to what has been discovered about wheat, will only leave the reader hungry for more information.

In Eriksson and Henning's exhaustive volume on wheat-rust—to which I can discover no reference here, the author confining his remarks to a note they published last year in the *Zeitschrift f. Pflanzenkrankheiten*—the student will find that as matter of fact some varieties of wheat suffer little, and others much from *Puccinia*.

I remember being strongly impressed, in 1880-81, by the varied differences between the *Hemileia* on coffee and that on *Canthium* in Ceylon, and even then threw out the hint that the former had been derived from the latter; but the comparative immunity of *Coffea Liberica* as constrasted with *C. Arabica*, suggested that it was not impossible that a disease-resisting coffee should be found.

The subject is complex and bristles with difficulties; but that is no reason for hesitating as to the experimental inquiry; and indeed it has already been commenced in several countries, as the reports from Australia, America, and elsewhere show.

Another feature of interest and importance in Von Tubeuf's book, is the chapter on "preventive and combative measures," involving the treatment of diseased plants by means of chemicals. Here, again, I notice a lack of attention to the English literature: Berkeley, and others of our countrymen, had experimented with sulphur in various forms, long before most of the authorities mentioned had taken the matter up. Still, it is quite true, the introduction of Bordeaux-mixture, and its employment on the enormous scales adopted in France, Australia, America and elsewhere, have taught us much, and suggested more. It is a common mistake to suppose that the intelligent application of remedial measures to plant-diseases does not pay—there are plenty of witnesses to the contrary; but, unfortunately, school and university courses generally have allowed of so little attention to the knowledge that must be utilised in carrying out such measures, that even skilled farmers, foresters, and other cultivators of plants, have to enter upon these experiments quite unequipped for carrying them out properly.

Tubeuf's chapter on the "economic importance of diseases of plants" may be cordially—if sadly—recommended to all who are interested in the very necessary extension of technical education by the institution of agricultural schools and colleges. He quotes the losses due to the Californian vine-disease (1892) at 10,000,000 dollars; in 1891 the wheat-rust cost Prussia over £20,000,00, and Australia something like £2,500,000. Even allowing for large exaggerations—though reports from Sweden, India, Ceylon, the West Indies, and elsewhere suggest similarly large losses from fungus epidemics—in these estimates, it is evident that we have here to deal with the annual losses of which even a saving of a very few pounds per cent would be worth consideration; and the comparatively meagre experiments to hand hold out hopes of much more considerable saving, if steps are taken in time, with a due and intelligent knowledge of the problems to be faced, and the methods of facing them.

TEA-GROWING IN JAPAN: MR. BALLARDIE'S VISIT.

Seeing his whole absence has only been a little over three months, and that he visited Hongkong and Canton on the way going, and Shanghai on his way back, Mr. Ballardie had only a few weeks to give to Japan. The favourite route was followed, calling at Nagasaki, passing through the Inland Sea to Kobe, thence round to Yokohama and from there into the interior, visiting most of the places of note and attaining at one place an elevation of 5,000 feet above sea-level. All was very enjoyable notwithstanding occasional uncertain weather.

At Ugi, Mr. Ballardie was in the centre of the tea-growing districts; but unfortunately it was the season for pruning—done by women and youngsters after a very rough fashion with big knives, just as if hacking into a hedgerow—and very little plucking was seen. What he saw, however, was exceedingly coarse, and the cultivation is chiefly in garden style, though there are some considerable areas, kept in good order One peculiarity was the artificial shade provided for the tea in pandals—shelter from frost is winter and spring perhaps, but also to induce tender buds. At Kobe, Mr. Ballardie was in a "Hong" employing some 500 coolies preparing tea,—withering in the sun, then firing, artificial facing and packing. Everything is very primitive and un il the Japanese learn to pluck more carefully and to use machinery, they cannot do much. Mr. Ballardie is surprisep more do not visit Japan; and yet a round dozen from Ceylon met in a local hotel one day including Messrs. Anstruther, Hadow, Major and Mrs. Lowry. He also saw Capt. and Mrs. Bayley in passing through.

NEW AREAS OF CULTIVATION IN N. C. PROVINCE.

Of the 775 acres of land sold during the year about 500 were opened. The sum total of the sales amounted to R13,348. No large blocks of land were sold: nearly all were small lots below village tanks, and realized an average of R17·21 per acre. This is satisfactory, for what I wish to encourage is the purchase by villagers of lands below their village tanks. In most cases the villagers have as much land as they can cultivate; as the restorations of tanks progress the sales of lands should also increase. What is chiefly wanted now is more population and more enterprise, and though some of my predecessors objected to the low-country Sinhalese coming amongst Kandyan villagers, there can be no doubt that there is more go in the low-country man, and that his enterprise stirs up his more apathetic Kandyan brother, and that he really does good. There seems a greater inclination now to grow coconuts, and I hope soon to be able to dispose of some high lands for coconut cultivation to some enterprising low-countrymen. —*Mr. Byrde's Administration Report for 1896.*

THE HURLEY-BURLEY WIND AT THE KNUCKLES!

(From a Planter.)

If in some places there be a question as to the want of energy in the present S.-W. monsoon, it is not at the Knuckles that they dispute it. There, at present, there is wind enough for any half-dozen ordinary districts in Ceylon, with a margin over to restore the lost character of any suspected monsoon to regulation vigour. The configuration of land with its deep and long valleys, up which it can rage, allows of more than justice to its excessive boisterousness. When the wind is in a playful mood you have to furl your umbrella and put the strap of your hat under your chin; but when it wakens to real earnest, you have got to stop and hold on, if you chance to be on a ridge. Coolies have been blown over lately when plucking; one factory had over sixty panes of glasses blown in, in a squall; bungalow windows have been banged open which had been thought to be securely fastened;—but the crowning feat of the roaring element has been causing a flush to disappear, and making the S. D. to look foolish, wandering about looking for it! When he reported to his chief that there was no need for pluckers that day, as the flush had been blown, he expected to be denied belief; but the P. D. had experience of what a raging element the wind was in those parts, when it got anything like "a fair field and no favour" and knew besides that "truth was often stranger than fiction." Galvanized sheets flying about in the squally days of the S.-W., are common enough, and the visitor from more sheltered districts has disturbed nights, as the wind rages around, and threatens to pull everything down. All the same, it is fine healthy bracing weather, and the tea is looking fit for anything, waiting only for a chance.

THE AMSTERDAM CINCHONA-MARKET.

Our Amsterdam correspondent writes, under date of June 23:—"Today the quantity of cinchona-bark put up for auction on July 15 has been made known. It amounts to 258 bales, 53 cases of Government bark, and 4,770 bales, 524 cases of private bark; total, 5,028 bales, 577 cases, which is a fairly large quantity. Besides this quantity the stock in first hands only consists of 1,301 cases Government bark and 238 cases private bark, which is the smallest we have known for years There are rumours that the export from Java for June will be large. These are based upon the applications made for space in the steamers at the beginning of the month. A few parcels of *Druggists'* quill have been sold privately since the auctions at somewhat advanced prices. The buyers for *Manufacturing* bark, however, are very reserved, and no business has been reported."—*Chemist and Druggist*, June 26.

FORESTLAND FOR SALE ON THE ANAMALAI HILLS, COIMBATORE.

WHY SHOULD PLANTERS GO TO SUMATRA, JAVA, OR EVEN THE STRAITS?

We direct attention to an advertisement from the British Collector of Coimbatore elsewhere. Eighty square miles of hillcountry in the Anamalais are declared to be available for the selection of suitable forestland by planters of tea, coffee, &c. We give the following information from Balfour's "Cyclopædia," new edition:—

ANIMALLY, literally Elephant hills, a mountain range in the collectorate of Coimbatore, in the southern part of the Peninsnla of India, and in the Travancore dominions, extending from lat. 10° 13′ 45″ to 10° 31′ 30″ N. long. 76° 52′ 30″ to 77° 23′ E., with peaks up to 8850 feet high. There are small scattered colonies of the Kader, the Malai Arasar, Pulyar, and the Maravar races. The Kader are open independent, straightforward men, simple, and obeying their Mopens or chiefs implict'y. They are of small stature, strong built, active, with woolly hair, and something of the African features, and file their front teeth to a point. The women wear enormous circles of pith in the lobes of their years, which they distend down to their shoulders. A black monkey is

their greatest dainty. The Malai Arasar are taking to agriculture. The Pulyar are demon-worshippers. The mountains are covered by valuable forest trees, and at one time were worked with an annual profit of about 50,000 rupees a year, and there are many beautiful woods suited for turnery. The wild animals are the elephant, tiger, leopard, bear, hyæna. wild dog, bison, sambur, spotted and barking and hog deer; also the wild goat.—*Lt.-Col. Hamilton in literis*; *Imp. Gaz.*

COIMBATORE district occupies an area of 7,432 square miles, over which about 7,000 villages and hamlets are spread, possessing a population of 1,763,274 human beings. It has but little rain. The produce is grains, mostly of the dry description, cotton, sugar, tobacco, and hemp. The climate is warm, and not unfrequently oppressive, being completely hill-locked. The Animallay Hills are in the S.W. border of Coimbatore, and are richly clothed with valuable forests, with many elephants; and some of the lower hill ranges from the Neilgherries, between which is the valley and gap or pass of Palghat leading to the western coast. The Guzzlehutty pass leads up the deep valley separating the Neilgherry Hills from Collegal.

Coimbatore land is many times valuable than it was forty years ago: and wheeled carriages, which were 603 in 1846-7, in 1867 were 4,500.

"Little rain" must refer to the lowcountry rather than to the hills.

CACAO CULTIVATION AND DISEASE AGAIN.

We draw attention to an interesting Correspondence sent to us, for publication elsewhere by one of the younger generation of planters, whom we are glad to see lfolowing the example of our "planting pioneers" in taking a thoughtful practical interest in their profession. Men of this stamp, far more than capitalists even, constitute the mainstay of the continued prosperity of the planting enterprise and the Colony. Mr. Greig is not alone in the view he has taken of the evils attending free " ckering": one of the very oldest of our cacao planters gave a word of warning on the subject some time back. Meantime, the sample which Mr. Green has given of the views of Mr. Willis and himself, must make all look forward for the matured opinions of both gentlemen. The grafting of the valuable but delicate Caraccas or Red variety on the hardy Forastero, is one well worthy of experiment. We hear of one Ceylon plantation of Forastero in bearing, where there is not a trace of disease; but query whether the same extent of grafted trees would not be even more valuable. Grafting, however, is for the future; the immediate problem for solution is, how to save the already afflicted fields of the Red Caraccas Cacao in Ceylon?

COFFEE IN THE HAWAIIAN ISLANDS.

Coffee, according, to the report of Mr. Consul-General Harris, is attracting much attention in the Hawaiian Islands, and promises to become an important article of export. Though yet in a somewhat experimental stage, coffee planting has nevertheless made great strides in the last five years, and "there is every reason to believe that ultimately the industry will be placed on a sound and profitable footing." Before that end has been attained, however, "it is not improbable that several failures and disappointments will take place from various causes." The situation at the present time is very similar to that of Ceylon in the early days, when plantations were started in all sorts of unsuitable places without any regard to soil or elevation, the result being that many estates were abandoned and large sums of money were lost before coffee planting could be called a success or a profitable investment. That the Hawaiian Islands are eminently adapted to the successful cultivation of the plant seems to be assured by the numerous patches of wild coffee trees throughout the islands, but particularly in the district of Kona, in Hawaii; but whether they will produce trees yielding crops year after year which will prove remunerative to the planter, with the high price of labour as compared with other countries, is a question which remains to be answered. With regard to labour for coffee culture there is said to be much diversity of opinion. The best authorities are opposed to the contract system, which has been in practice in the past on the various sugar plantations, and is still greatly in vogue. The contract plan was the only one at first open to the planter that secured him means for controlling and retaining his labourers on his plantation, but it was open to many serious abuses, and has caused from time to time endless trouble and disputes. At present the feeling is strongly in favour of the monthly free labourer, and the Japanese as a class, when properly handled, are found to be steady, good workmen. The Chinese also make excellent field hands, but they are very scarce for such purposes. The native Hawaiian cannot be recommended, being by some authorities considered totally unfit as a labourer on a coffee plantation, as he is "most unreliable, and from his nature seems to abhor any employment which demands constant and regular attendance." Other authorities, again, have great hopes that he will become useful in the coffee fields, and that the more intelligent may ultimately, like the Japanese, be even trusted with pruning and planting. *H. and C. Mail*, June 25.

A TIN AND COFFEE COUNTRY. ALSO COCONUTS, FIBRES, FRUITS, RUBBER, &c.

(*In Conclusion.*)

I have written of coconuts and coffee as products to be largely produced in the near future, but have said little about another product, "padi" (rice in the husk). It is at present grown only to a very limited extent. There are many thousands of acres lying waste on which it could be grown profitably, and the attention of Government is directed to irrigation works for those districts that offer the largest field for this industry, which is almost entirely in the hands of Asiatics, but not necessarily Malays, who stick to their ancestral fields and have little desire for pastures new. The fresh departure in this line is more by Chinese and Japanese, though the Tamils will no doubt eventually come in. The importance of the development of this industry is shown by the large quantity of rice annually imported up to the value of a million-and-a-half of dollars.

So far Perak has produced but little of the fibres of commerce, but the country has extensive tracts suitable in soil, and this, coupled with the heavy, well-distributed rainfall, has attracted the attention of those interested in Ramie grass, from which a beautiful fibre is produced by recent processes of decortication and degumming. As the quality of this fibre, and the processes by which it can be made fit for the spinner, are fully and successfully proved, there is every probability that Ramie grass growing and fibre producing will become a great industry in Perak and the other States. This fibre is of such excellence in strength and fineness, and the countries are so few where the grass can be grown profitably, by reason of droughts and climate, that it can hardly be overdone where the conditions are favourable.

Fruits of various kinds are grown, but two stand out prominently, the mangosteen and the durien. The former is a delicious fruit, slightly acid, with a delicate but characteristic flavour. The contrast between the white of the fruit and the purple of the rind is as striking as it is beautiful. The durien, so far as smell is concerned, is indescribable. All Easterns who have ever tasted it crave for this fruit, though the odour is overpoweringly offensive and the taste to one who has tried it for the first and last time sickly and repugnant.

The liking, once acquired, like other habits, sticks, and the craving of the European becomes as strong as that of the Asiatic. The Malay, who owns some durien trees, builds himself in the fruit season a hut near the trees, perched high up on poles, and jealously guards them from all intruders, of which there are many of the animal kind. Bears, monkeys, squirrels, elephants, horses, cattle, goats, pigs, are all fond of this extraordinarily offensive but fascinating fruit. Tigers even, of which there are many in the country are credited with liking it; but that is a statement not verified, and it is supposed Stripes is more after the animals looking for the fruit than after the fruit itself. The produce of half-a-dozen durien trees will, with sundry other aids, keep a Malay family in comfort for a twelvemonth.

Pepper of excellent quality is produced largely in the Malay States, inside and outside the Confederation, and forms a considerable part of the export of that spice to Europe from the ports of Penang and Singapore. It may not be generally known that the black and white pepper of commerce come off the same vine, and that the white is made so either by steeping in water and rubbing off the black skin, or by decortication in special mills on the banks of the Thames. The latter is the white most prized by sausage and such like manufacturers. Sumatra and some other of the islands of the Eastern Archipelago also contribute to the pepper supply of the world, but none produce a finer quality than Perak, if we except a small Malay State called Trang, north of Keddah.

Nutmegs and cardamoms grow wild in the jungle, and are collected by the Malays for sale.

The indiarubber tree (ficus elastica) is a well-known forest tree, attaining immense dimensions. The Malay has no idea of the slow process of milking the tree, but cuts it down, with the result that it is in a fair way of being exterminated. The same fate is threatening the gutta-percha trees, of which there are several varieties in the forest.

Sugar is grown extensively only in one district (Krian), but if there were any improvement in the price other districts could grow it as extensively. It is a cultivation much in favour with the Chinese and whatever they take up and gives a fair profit is sure to be persevered in and rapidly extended

Tobacco has not been much grown, and lacking probably the finer soil and more suitable climate of Sumatra, where the finest known leaf is produced, it is not likely this product will ever be extensively grown in the Malay States.

Such are the prospects in Perak for the future advance of the State in tropical agriculture. The cordial support and encouragement of the Government is all that is needed to bring the State into the front rank for the production of most of the products mentioned, and probably for a good many more.

Having touched on the Perak of the past, of the present, and of the probable future, I may fitly conclude my remarks by the enquiry how this future that lies before the country is to be hastened and brought into operation. Not, I may answer, by the present system of an imperium in imperio, but by placing more power in the hands of the immediate and active head of the Confederation, and so enabling him to pledge a year's revenue of the combined States, say ten million dollars (as it will be a year hence if it is not now) for a loan to extend railways and roads,* proceed with irrigation works, and give encouragement to planters and settlers to engage in the cultivation of coconuts, coffee, padi, sugar, pepper, and all the other products of export and commerce.

The tin mining industry is so well established that it does not require special encouragement, but the gold mining, confined to the more isolated districts of the North of Perak and Pahang, requires extension of communications in these directions before any progress of consequence can be made. Were this reasonable power given the Resident General, and a forward policy inaugurated, another thing would happen in a few years, the Malay States outside of and surrounding the Confederacy, Kelantin and Trenganu on the East, Johore on the South, Reman and Keddah on the North, would have to fall into line and come into the Bund, and so fulfil the dream of those who have foreseen the unity of the whole of the Malay States of the Peninsula for general purposes and the common good, under the sheltering wing of the great Empire of the East and the West. D. MACKAY.

—*Inverness Courier*, June 22.

* A loan of 5 million dollars has been sanctioned by the Secretary of State for railway construction in the Federated Malay States.—ED. *T.A.*

PLANTING NOTES.

COFFEE GROWING.—"In a recent number of this magazine"—'The Hawaiian Planters' Monthly'—"a writer stated the cost of bringing a coffee plantation into bearing at ten dollars per acre. Ten pounds are nearer the average cost to the end of the third year, as may be seen in an article on coffee in this number." The article is one we copied from a New South Wales journal by Mr. C. Skelton. Our contemporary must remember that the cost varies with the charge for land, for labour and food. In Ceylon in old days the cost varied from £5 to £30!—the latter where the land cost R200 or more per acre.

A PARADISE FOR COFFEE AND CACAO.—Mr. G. W. Ward in the London *Daily Mail* gives a glowing account of the growth of coffee and cacao around Harrar in Eastern Abyssinia—see page 166. We presume Mr. Ward must have accompanied Mr. Rennell Rodd's mission to King Menelek. Of course, Abyssinia is the native home of coffee—so that we are prepared to hear of bushes or trees doing wonders in the way of crop; but it is a surprise to hear that cacao has also found a home in this region and is prospering exceedingly. It is certainly a great pity the district should not have good government and be open to British colonization. Perhaps King Menelek might be tempted by some exchange in the Soudan region?

SOAP MANUFACTURED IN FIJI—WHY NOT IN CEYLON?—A correspondent writes:—"Some weeks ago I wrote to you wondering why we had no soap manufactory in Ceylon, mentioning that such existed in far away Fiji. I enclose an advertisement cut out of a Fiji paper to show you what kinds of soap are manufactured":—

TO STOREKEEPERS, TRADERS, ETC:

LIST OF PRICES OF SOAP AS MANUFACTURED BY SUVA SOAP AND OIL COMPANY.

	Per case.
No. 2 Blue Mottled ..	.. 24/6
No. 1 Blue Mottled ..	.. 26/-
Extra Special, Blue Mottled	.. 29/6
Household, No. 3 ..	.. 19/6
Household, No. 2 ..	.. 20/6
Household, No. 1 ..	.. 22/-
Golden Crown Yellow ..	.. 23/-
Double Crown Yellow ..	.. 24/6
Extra Special Yellow ..	.. 29/6

To be obtained at above prices from all Merchants and from

THE SUVA SOAP AND OIL CO., Suva.

MESSRS. R. BENTLEY AND CO., Levuka.

It is certainly rather absurd that a minor colony like Fiji should be making its own soap, while Ceylon with its widespread coconut plantations, pays away every year as much as R200,000 for soap. Half, if not two-thirds, of this at least ought to be saved by a local manufactory properly conducted.

"ASH OF COCONUT HUSK."

THE VALUE OF SALT IN COCONUT PALM CULTIVATION.

The following communication from our City Analytical Chemist, Mr. Cochran, although it may look, to the general reader, very dry and technical, is of special value to all cultivators of the coconut palm and in some degree to agriculturists generally. In the first place we are particularly pleased to have this important testimony—(added to that of Messrs. Davidson and Lepine whose figures in our "Manual," however, referred to Jaffna peninsula)—to the value of common salt in palm cultivation. Only a few days ago, we were astounded to have a planter of experience declare to us that, in his opinion, salt was of no value to cultivators in Ceylon! He no doubt chiefly referred to cultivation otherwise than of coconuts, though he made no exceptions. We should like Mr. Cochran's opinion as to the value of "sodium chloride" as a manurial agent, in respect of a variety of industries in the island, in order to justify the call —in next Session of our Legislature, we hope,—for leave to use untaxed salt (made useless for human food) for agricultural purposes. What Mr. Cochran says of the value of burning coconut husks and returning the ashes to the soil, ought to be made known and acted on far and wide, among the natives especially. At present these husks, in some cases, are being sold for less than their value as manure. It will be observed that Mr. Cochran evidently inclines to the view—though he has not yet demonstrated it by analysis—that the farther coconut palms are situated from the sea, the more likely they are to benefit by the direct application of "sodium chloride," or common salt. Here is Mr. Cochran's Report (which is just in time to be included in the new edition of our "Coconut Planters' Manual" now passing through the Press):—

I had recently occasion to ascertain the amount of potash in coconut husk; and, not being able to meet with this information in any of my books, I determined the same in the ash of a ripe coconut grown in the neighbourhood of the sea. I further extended the examination to the other ingredients of the ash of the coconut husk, knowing that such an analysis was much wanted.

The nut was one of fair, if not large size; weighing with its husk and calyx 3·482 lb. The nut alone weighed 1·693 lb., so that the husk and calyx weighed 1·789 lb.

One-third of the husk, cut longitudinally with a third of the calyx, as the smallest portion that one could be certain of as representing the whole husk, was incinerated at the lowest temperature practicable. The temperature was kept low to avoid loss of the chlorides of the alkalis by volatilisation. For the same reason, I did not attempt to procure a white ash, but stopped the incineration while there was still an appreciable amount of unburned carbon present.

The crude ash, which amounted to 1·9381 per cent. of the husk, was analysed, and from the results obtained the composition of the pure ash was calculated. The following were the results of the analysis:—

	Crude Ash. per cent.	Pure Ash. per cent.
Carbon ...	4·57	—
Insoluble silica ..	3·00	3·14
Soluble silica ..	3·80	3·98
Lime	3·38	3·54
Magnesia ..	3·60	3·77
*Potash	29·06	30·45
*Potassium chloride ..	3·44	3·60
Sodium chloride ..	38·17	40·01
Phosphoric acid ..	1·18	1·24
Sulphuric acid ..	1·35	1·41
Carbonic acid, &c. ..	8·45	8·86
	100·00	100·00
* Equal to total potash ..	31·23	32·72

The crude ash from one husk amounts to ·034673 lb. or 34·673 lb. per 1,000 husks.

One thousand husks carried off the estate thus removes from the soil

Potash	10·828 lb.
Lime	1·172 „
Magnesia	1·248 „
Phosphoric acid	·409 „
Sodium chloride (Common Salt) ..	13·235 „

It is only necessary to multiply these figures by the number of thousand nuts grown upon an acre of land to ascertain the amount of these mineral constituents removed per acre. Thus, if they are multiplied by 6, the results may be compared with those obtained by Messrs. Davidson and Lepine, approximately, the terms used by them, viz.: "Salts of potash" "salts of lime," not being quite definite. For comparision, I have changed pounds troy of Mr. Davidson's into pounds avoirdupois.

MORE IMPORTANT MINERAL CONSTITUENTS, IN 6,000 HUSKS.

	Messrs. Davidson & Lepine. lb.		From Seaside Nuts. lb.
Potash ..	252· 00	..	64·968
Lime ..	55· 00	..	7·032
Magnesia ..	—	..	7·488
Phosphoric acid..	2· 27	..	2·454
Sodium chloride (Common Salt).. ..	28·117	..	79·410

It will be observed that there is no approach to agreement in the two sets of results except in the case of the phosphoric acid. Mr. Davidson finds that the coconut husk removes much more potash from the soil, than the entire amount of crude ash according to my calculation from seaside nuts.

I am not at all disposed to attribute all the difference in the foregoing sets of results to the cruder methods of analysis prevailing when Mr. Lepine made his determinations. I have no doubt differences of soil may account for part of it. I can well believe, from theoretical considerations, *e.g.*, that coconuts grown on a rich alluvial soil would have husks, the ash of which would differ in composition from those grown on sandy soil in the neighbourhood of the sea, in the direction of containing higher proportions of potash and lime and a lower proportion of common salt. It must be a satisfaction, however, to coconut planters to know that the coconut husk is not necessarily nearly so exhausting to the soil in the matter of potash as would be naturally inferred from the earlier analyses or estimates. At the same time, the ash of the husk is far richer in potash than any wood ashes I have analysed, and if the unit, *i.e.*, the hundredth-part of a ton of potash be valued at R2·50, a ton of the crude ash is worth for its potash alone R78, and, with the phosphoric acid, fully R80. It would take 64,604 husks, similar to the one dealt with, to furnish a ton of crude ash. One thousand husks, therefore, are worth for their potash and phosphoric acid alone about R1·24; or, to put it with greater accuracy, the ash of 1,000 husks is worth for its potash and phosphoric acid R1·21. This is without assigning a value

to the lime, magnesia and common salt. A few intelligent coconut planters consider it more economical to burn the husks and return the ashes to the soil than to sell the husks at rates, including delivery, of from R1 to R3·50 per 1,000 according to the distance from the estate of the Fibre Works. The results of my analysis quite confirm this view; and, as soon as it comes to be generally recognized and acted upon, the price of husks must rise, to the benefit of the cultivator.

It will be observed that the ash of the husk of a seaside nut is very rich in common salt; indeed, more so than the ashes of many marine plants. This led me to determine whether or not a considerable portion of this might not be simply a deposit on the outside of the husk from the sea air. A pretty large nut weighing 3·8 lb. was, therefore, washed with distilled water, and the amount of salt in the solution determined; but it only amounted to a little over one-tenth of a pound per 1,000 nuts. The coconut husk is not unique as regards the large amount of common salt in its ashes; thus, the ash of the root of the Mangold-wurzel contains 49·5, and the ash of the leaves of the same plant contains 37·7 per cent of common salt.

In order to ascertain how much common salt is really necessary to the proper development of the coconut husk, analyses would have to be made of well-grown husks from trees situated far from the sea.

The common salt in the husk is got rid of to a large extent in the process of steeping the husks. Thus, in the drainage water from pits on which coconut husks have been steeped in well-water, I have found, when analysing the same on behalf of the Colombo Municipality, chlorine equivalent to from 34 to 44 grains per gallon of common salt, the greater part of which must have come from the husks.

M. COCHRAN.

THE SAN PAULO COFFEE ESTATE CO., LD.

As everything bearing on tropical products interests us, we quote as follows from the prospectus of this Company:—

This Company has been formed to acquire certain coffee estates and other properties in Brazil, which Messrs. Schroder Gebruder & Co., of Hamburg (the vendors to the Company), have agreed to acquire from the Conde de Sao Clemente, who has been in possession of the estates for many years. The property as described in the accompanying memorandum shows an area of about 9,225 acres (3,735 hectares) of coffee land and about 5,981 acres (2,541 hectares) of other land, and is situate in the province of Sao Simao, and is comprised of the estates of Santa Olympia, Sao Joaquim and Chanaan, which are contiguous and at a distance of six, 10, and 18 kilometres respectively from Serra Azul station, on the Mogyana Railroad. Messrs. Zerrenner, Bulow & Co., of San Paulo, in Brazil, reported upon the property at the request of Messrs. Schroeder Gebruder & Co. A copy of their report accompanies this prospectus. From the memorandum and report it appears—

Approximately Santa Olympia contains 810 alqueires of coffee land and about 979,000 coffee trees; Sao Joaquim contains 236 alqueires of coffee land and about 232,300 coffee trees; Chanaan contains 497½ alqueires of coffee land and about 390,000 trees. In addition thereto there are at Chanaan about 1,000 alqueires, and at Santa Olympia 50 alqueires, of low grounds for other cultivation and pasturage.

The coffee plant comes into good bearing after the plants are six years old, and it will be seen from the following table that the plants are of various ages, young plants coming on in rotation:—

	years old.		years old.
140,000 being	17	93,000 being	5
88,000 ,,	14	25,000 ,,	4
155,000 ,,	9 to 13	132,000 ,,	2 to 3
155,000 ,,	8 to 10	259,300 ,,	1 to 3
		1,601,300 trees.	

There is amongst the coffee land about 2,720 acres available for for further planting. The estates are equipped with dwellings, machinery, workshops' and various appliances for the management of the estates, accommodation for labourers, and other appliances suitable for a large business, and on the property is a railway and a canal belonging the estates.

The railway connects the estates with each other and places them in connection with Serra Azul Station on the Mogyaua Line. The estate railway measures about 32 kilometres with branches and sidings, and is used, not only for the carriage of produce of the estates, but also for the carriage of produce of surrounding estates, and arrangements have been made with the Mogyana Railway Company under which that company pays 8 milreis for every ton of coffee delivered at Serra Azul Station by the estates railway. The Company acquires the benefit of this arrangement.

As therein stated, the returns of coffee sent to Santos, and the amounts realised, after deduction of the expenses from the estates to Santos, are given:—

1894, 62,099 arrobas, realising 1,061,000$000, calculated at the exchange of 7⅞d.=£34,813.

1895, 64,481 arrobas, realising 1,271,000$000, calculated at the exchange of 7⅞d.=£41,704.

*1896 (approximately) 104,000 arrobas, realising about 1,700,000$000, calculated at the exchange of 7⅞d.=£55,781.

*Since ascertained.

The 1897 crop, now being picked under very favourable conditions, is estimated at a minimum of 80,000 arrobas—a diminution in the yield as anticipated and explained in Messrs. Zerrenner, Bulow & Co.'s report—which further puts the future production at an average yield of 125,000 to 130,000 arrobas, owing to the increasing production of the younger plants, of which there are a large proportion.

125,000 arrobas at the present depressed price, 9$200 per 10 kilos, equal to 13$800 per arroba, would give	1,725,000$000
Less expenses as hitherto incurred, 5$900 per arroba	737,500$000
Would yield a net return of	987,500$000
At the exchange of say 7⅞d	£32,402

There are other sources of revenue arising from trading profits on commodities bought by the colonists and others in the neighbourhood—also from railway traffics on goods other than those carried for the Company.

The annual amount required to provide for the interest on the debentures now offered is	£8,800
The amount required for the sinking fund is	4,000
The amount required to pay the interest on the preferred shares annually is	8,400
Total amount required for the present issue	£21,200

Leaving a considerable surplus for contingencies and dividend on the deferred shares.

The Company has entered into a contract for the acquisition of the property and estates and the provision of working capital hereinafter mentioned, in consideration of the issue to Messrs. Schroder Gebrüder & Co. and the Condé de Sao Clemente, and their nominees, of the whole of the share capital of the Company, and the whole of the first mortgage debentures, all credited as fully paid up, or of the proceeds thereof, and the issue of mortgage debentures and preferred shares is now made on behalf of the vendors. The 15,000 deferred shares are held by the Condé Sao Clemente, the present proprietor, the vendors and their friends.

The vendors agree to provide the Company with £10,000 sterling in cash for working capital, and to bear and pay all costs, charges and expenses whatever, including legal expenses, printing, advertising and brokerage, the investigation of title, and the transfer of the property and all stamps in Englan

and Brazil. The purchase price has been fixed by the vendors, who have agreed to buy the property from the Condé de Sao Clemente, in consideration of cash and of deferred shares.

The properties are being worked on account of the Company from the 1st day of January, 1897, so that the Company is entitled to the crop now being gathered. Messrs. Zerrenner, Bulow & Co., of Sao Paulo and Santos, have been appointed agents for the Company in Brazil, and are arranging for the appointment of a competent resident manager.

The debentures are secured by a deed of trust dated the 9th day of June, 1897, and made between the Company of the one part, and Bruno Schroder, Esq., and Walter Campbell, Esq., as trustees, of the other part, and which contains covenants by the Company, with the object of the debentures being entitled to the benefit of a specific mortgage on the coffee plantations and other immoveable property in Brazil. The deed, of trust also provides that the debenture debt is to be a charge upon the Company's other existing properties, stocks, &c., as a floating security. Any new coffee plantations which the Company may hereafter acquire will not be included therein. By the deed of ttrust power is reserved for a prescribed majority to bind a minority of the debenture holders.

EXTRACTION AND PREPARATION OF TALC.

Talc is extracted on a large scale from the granite mountain of St. Barthelemy, in the French Department of Arriege, about 32 kilometres (20 miles) from the main chain of the Pyrenees. The principal quarry, at Tremouin, is worked open-cast in three banks or terraces, each about 15 metres (49 feet) high. The best rock is of a bright white tint, and feels greasy to the touch when reduced to fine powder. The quarried rock is brought by a tramway to the end of the quarry in the Axiat Valley, and then by wagons for a distance of 19 kilometres (11 miles) to Luzenac, where 90-horse water-power is taken from the Arriege river. The mechanical preparation consists of drying in a rotary oven, breaking up small, grinding and sifting, the grinding being effected in mills with steel balls. The larger portion of the product, observes an Ingenieur des Arts et Manufactures, who has communicated these particulars to the *Chronique Industrielle*, is converted into powder, only a small portion being sent away in the rough state, or cut into pencils for writing on metals. Besides its use throughout most parts of Europe and America, in soap and paper-making, talc enters into the composition of wagon-axle grease, while it also serves as an insulator for electric conductors.—*Journal of the Society of Arts.*

NEW AREAS OF CULTIVATION OPENED DURING THE YEAR IN MATARA DISTRICT.

The largest extension of cultivation has been in citronella. The high prices ruling early in the year, and probably the existence of contracts, led to good prices being realized at the Crown land sales, and induced private owners to open more land, and in some cases to extend their operations and buy in the Morawak korale, where there had been little hitherto. About 2,500 acres were planted in 1896. About 100 acres of tea were opened in the Weligam korale by natives and about 900 in the Morawak korale. In coconuts little, if anything, was done beyond small village patches of a few trees, and what I have previously referred to as planted by Mr. Le Mesurier.—*Mr Vigors' Administration Report* for 1896.

OPENING OF NEW CULTIVATED AREAS: S. PROVINCE.

A very small extension of the area under paddy was reported; all are turning their attention to tea, citronella, and coconuts. The Mudaliyar of Gangaboda pattu estimates that there was an increase of about 500 acres under tea in his pattu; the Mudaliyar of Wellaboda pattu estimates the increase under the same product at about 400 acres. Citronella is advancing chiefly in the Talpe pattu; cinnamon in Bentota-Walallawiti korale and the Wellaboda pattu. The following table will show the principal products and the area of cultivation:—

Product.	Area in Acres.	Product	Area in Acres.
Coconut ..	94,000	Tea ..	7,760
Paddy ..	43,000	Cinnamon	4,680

Citronella being a comparatively new product finds no place in the Blue Book returns. This should be rectified.—*Mr. Wace's Administration Report for 1896.*

THE RUBBER INDUSTRY IN WEST AFRICA.

From a paper recently read by Sir Gilbert T. Carter, K.C.M.G., before the Royal Colonial Institute, we quote what bears on the Rubber industry, and the very pointed comments of Dr. Morris in the discussion which followed:—

THE PRODUCTS OF THE COLONY OF LAGOS.

This Paper would be incomplete without some reference to the products of Lagos. Until the year 1895 the colony may be said to have relied almost entirely upon palm oil and palm kernels, which formed the bulk of the exports. In that year, however, a flourishing rubber industry developed, a brief acconut of which will not be devoid of interest. For some years a considerable quantity of this valuable product had been exported from the Gold Coast, due to the efforts of Sir Alfred Moloney; and he had, so far back as 1882, suggested the possibility of a similar industry at Lagos. Through his initiative some experiments were made upon rubber-producing plants, but it is difficult to stir up the native mind to effort in a new direction, and no practical results followed. During my expedition to the interior, in 1893, I had noticed the prevalence of a tree, in certain parts of the Yoruba country, having a milky sap; but as the tree was unlike any other rubber-producing plant which I knew, I attached but little importance to it. At that time there was in Lagos a political prisoner from the Gold Coast, who used to visit me occasionally to endeavour to obtain my co-operation in getting his release. On one of these visits he told me that he had learnt, from some of his Fanti surroundings, that the same tree whence the supplies were obtained on the Gold Coast existed in great numbers in the neighbourhood of Ibadan. I at once asked him if he could get some people down from the Gold Coast who understood the process of collecting and preparing the rubber, promising, if he did so, that I would put them in communication with the European officer at Ibadan, to whom I would give instructions to have the men properly accredited to the native authorities, who, I felt sure, would be glad to assist them in a enterprise which would be a source of additional wealth to the country. He promised that he would do so, and as soon as practicable about forty Fanti rubber-collectors arrived from the Gold Coast. These men were despatched, as I had promised, and in a very short time samples of rubber were forwarded which convinced me that Lagos was on the eve of a very important addition to its exports.

A notice was issued apprising the merchants of the possibilities before them, and I will only add that my most sanguine expectations were more than realised. Indeed, the development of the industry was phenomenal. While, in 1893, the total export amounted to 5,867 lb., valued at £324 6s 4d, the following year it rose to 5,069,576 lb, valued at £269,893. Through the courtesy of the Colonial Office authorities, I have been able to obtain the figures for 1896, and learn that for that year the value reached the large total of £347,730. It is feared that unless means can be devised to prevent the trees,

from being over-tapped, their wholesale destruction will follow; but obvious difficulties are in the way of any satisfactory check in this direction, more especially as but little rubber is found within the British jurisdiction. I do not think, however, that the trees are destroyed to anything like the extent which is generally supposed. The tree is known as the "Kickxia africana."

EXPORTS.

It has been previously stated that the total exports for 1895 amounted in value to £985,595, and it will be interesting to see how large a proportion of this sum is ditributed amongst the three main staples of export trade of Lagos. The details are asfollows:—

Palm Kernels	£320,434
Palm Oil	205,553
Rubber	269,892
Total ..	795,879

When it is stated that out of the difference between the two totals no less a sum than £100,789 represents specie, exported mainly to West African ports, it will be understood how comparatively unimportant are the other local products.

The bulk of the palm kernels is absorbed by Germany, the figures being:—

Germany	£227,556
Great Britain	92,877

The distribution of palm oil is as follows:—

Great Britain	£155,344
Germany	48,528
France	1,680

and of rubber:—

Great Britain	£166,343
Germany	79,999
Cape Coast..	17,471
Accra..	6,077

From this it will be seen that Lagos helps to swell the export of this commodity from the Gold Coast. It would appear that the process of drying the rubber is understood better in that Colony, and probably its improved condition pays for the double handling.

DR. D. MORRIS, C.M.G.: Not long ago we had the pleasure of hearing a Paper from Sir George Baden-Powell on West Africa as a whole. Now we have been favoured with an account of one of the most important Colonies in that part of the world. The Governors present have been specially connected with the wonderful development of West Africa. Taking only the rubber industry, Sir Alfred Moloney has told us how in the Gold Coast Colony in 1882 hardly any rubber was exported, and yet through his individual interest in the matter it is now exporting rubber to the value of £200,000. Sir Alfred mentioned £100,000, but the exact figures were £218,162 in 1893. It was important that capable and progressive men should be sent out to administer our Colonies, because they have it in their power to do more for their Colony than anyone else. Development is much more rapid when a Governor takes a real interest in the affairs of his Colony. In the case of Lagos its development has been most remarkable. For instance, the rubber industry in three years has risen from practically nothing to something like £300,000. Everyone who uses rubber in any way should feel grateful to Sir Alfred Moloney and Sir Gilbert Carter. In regard to the question of the future supply of rubber, companies are being floated, and a large number of people are saying, "If you plant anything, plant rubber." If, in a few years or so, rubber of the value of half a million could be raised in two little spots in Africa, I think the people who are advocating planting rubber all over the world should look more closely into the matter. We know that in Brazil the Amazon Valley and both sides of the Andes are largely devoted to the rubber industry. In Central America, Mexico, and other parts of the world rubber is likewise being produced as a forest product in large quantities. During the last twenty years the price, according to reliable statistics, has risen only a few pence per pound. Before we start planting rubber in our own Colonies, and especially on land which can produce other things more valuable, we should be satisfied that the rubber industry is not likely to follow the cinchona industry, which has caused so much loss to planters in the West Indies, India, and Ceylon. The tree which has been the means of yielding so much rubber in Lagos extends probably right across from Sierra Leone to the mouth of the Niger. The tree is not unlikely to be found in extensive tracts in the interior of West Africa. It is needless to say that it should be most carefully preserved in all the British Colonies where it is found, because it is not fit to tap until it is of some size, and it cannot again be tapped for some time. No doubt many trees are bled too severely, and killed. There is, however, a great difficulty in regulating the tapping of these trees and preventing their destruction; but there can be no doubt that everything should be done by the authorities to preserve them.

THE PROMISE OF CHEAPER RUBBER.

(*"India Rubber World" June 10th.*)

Bolivia's government has become very much alive to the possibility of greatly increasing the public revenue, and promoting public improvements and private enterprise, through the development of her rubber resources, and this is being attempted in many ways, including the admission of alien rubber-collectors on the same terms as citizens, which has not been permitted hitherto. There are yet many difficulties to overcome, but the example of the recent growth of Pará and Manáos, based upon the rubber trade alone, has not been lost upon the Bolivians.

An important steamer line has opened a new direct service to Iquitos, implying confidence in a largely increased trade with eastern Peru and the upper waters of the Amazon, the basis of which can only be rubber. Transportation facilities must exist before rubber-gathering can be developed, even in the richest districts. With sparse populations, indisposed to industry of every kind, the inducements to gather rubber must be definite. There must be frequent trips by steamers, trading stations with goods temptingly displayed, and collectors financially able to bring camps of laborers from a distance to supplement the work of the natives. Rubber comes to market from a new district in driblets—a few pounds here and a few pounds there—and a large production is a matter of long growth. But this growth has been in progress so long in the region beyond Iquitos that more substantial returns are now to be looked for.

The work of actively exploring for rubber in Brazilian forests which have not yet been attacked is likewise proceeding, and renewed interest is being manifested in the rubber resources of Colombia, Venezuela, and the Guianas, not to mention the rubber-planting projects in Mexico and Central America.

In Africa only the completion of the Congo railway is needed to give a great impetus to a rubber trade which already has assumed large proportions and made of Antwerp an important rubber mart. With the natural obstructions to navigation removed, no doubt the government will be pressed to amend the present restrictive regulations, with the effect of opening the rubber trade to all comers and largely increasing the output from the forests which stretch from the mouth of the Congo to the headwaters of the Nile. Then the probability of the abundance of the *Kickxia africana*—the tree which yields the rubber of Lagos—all the way down to the Congo gives promise of sources of rubber unsuspected until lately. Finally, in Asia, recent investigations have impressed the authorities of British Burma with the great extent of rubber forests in that country. The trade in rubber there has been in the hands of Chinese merchants who have tried to conceal the extent of the supplies, but while they have insisted that the trees were disappearing, the yearly exports from Rangoon have increased. Now that the truth is beginning to be suspected, the Chinese traders are likely to find competitors in the field.

NEW AREAS OF CULTIVATION IN SABARAGAMUWA.

The rapid, perhaps too rapid, extension of tea plantations is remarkable. The area of the new clearings for all produce is stated by the headmen at 3,800 acres, mostly for tea. The largest extent is 1,800 acres in Kadawata and Meda korales, *i.e.*, in the Balangoda planting district. In Atakalan korale the extension for tea is reported at 600 acres, chiefly at Madampe. In Nawadun korale about 600 acres have been cleared and in Kuruwiti korale about 300 acres.

The advance in the cultivation of paddy is represented by 144 acres, of which 131 was land under the Uggalkaltota irrigation channel.—*Mr. Moysey's Administration Report for 1896.*

LEGISLATION AGAINST WEEDS.

In Madras the State takes a benign concern in the destruction of weeds, namely, in the matter of cutting away the jungle-growth in the close precincts of villages, in which snakes are likely to find cover. The villagers are generally somewhat inert to the procedure, and the weeds, as far as the people are concerned may grow at will. None the less, the Government continues forcibly to urge the destruction of the weeds, and, even though for some reason or another, the deaths from snakes are greatly increasing in number, in spite of the efforts to the contrary, the destruction of weeds should tell if the thing were really done properly. In some of the United States the law is in serious force against weeds, not on account of snakes, but in the matter of agriculture. A bulletin of the Washington Department of Agriculture mentions that laws against weeds are found upon the Statute-books of as many as 25 States of the Union. In some cases, as in California, Delaware, and Kentucky, the law is directed against only a single species, usually the notorious Canada thistle. Other States, such as Minnesota and Ohio, proscribe as many as 14 pecies of weeds. The Canada thistle is on the black list in 21 out of the 25 States, whilst six States legislate against the Russia thistle. This "Canada thistle," by the way, is interesting—Canadian in nothing more than in name. It belongs to Great Britain, where it is known as the creeping thistle, growing to a height of some three or four feet, with dingy purple flowers. In some form or another, however, either in bales of merchandise, or otherwise, its seeds have followed civilisation round the world, all over Europe, into Asia, America and Australia. Weeds are peculiar things, and, like the rabit in Australia, most weeds are more prolific abroad than in their own home, and the creeping thistle is a much greater nuisance in Canada and in Asia than in its original home. The Washington Department has calculated that one per cent. increase in the crops of the United States, such as might be obtained by the destruction of weeds at little cost, would represent the large total of $17,000,000, and it urges that there should be a common federal law against weeds in general, though each State should necessarily be left to decide which are the particular weeds that need extermination within their own borders.

In India our agriculture is not yet crowded out, and the agriculturist soon gets rid of weeds when they interfere with his returns of rupees, annas, and pice. The mortality in human lives, however, is so great year by year from snake-bite—and shows such a tendency to increase seriously—that it might be well perhaps if villagers were not merely 'persuaded' but could be 'compelled' to cut away the snake-harbouring jungle within a certain area round their houses or their villages.—*M. Times*, July 13.

SOME INDIAN POOCHIES.

The last volume of Indian Museum Notes relates, among other miscellaneous reprints and notes, to an exhibit collection of economic insects in the Indian Museum, to some new species of Indian beetles, aphids and other insects, to insect pests and Indian "forest flies," and to the common crow of the United States as an enemy to insects and so as an aid to man. The notes are accompanied by three full page photo etchings of several of the *poochies* described, beautifully executed by the Survey of India Office in Calcutta. The exhibit collection has been prepared with a view to illustrate the life histories of some of the more important "economic" insects, both injurious and useful, in the various stages of their development, the pests being arranged in accordance with the plants which they attack. Thus we find 17 different insects which are harmful to tea bushes and three to coffee, either as defoliators or borers. No illustrations of these pests are given, which is to be regretted, as they would no doubt have greatly assisted planters in detecting these their enemies at a glance. Mr. C. Kerremans describes a new species of (Buprestid) beetle discovered in the Dehra Ismail Khan District, which is very destructive to melons and cotton crops He has dedicated this "very beautiful species" tothe memory of the late Mr. Atkinson, and it will accordingly be known in the future as *Julodis Atkinsoni.* The beetle is minutely described, but it is not everybody who will be able to make much of the following:—"Julodis Atkinsoni, nov, sp.—Oblonga, convexa, apice subattenuata, supra viridi obscura, nitida, elytrorum fossulis thoracisque punciis aeneo-viridibus; subtus viridiaenea, segmento abdominis 2°, 3°, 4°, que nigro coerulei cinctis, ultimo irregulariter nigro-vermicutato; pedibus aeneis, antennis nigris;—capite granuloso, fronte antice subrugosa, vertice longitudinaliter rugata;—pronote convexo, transverso, grosse punctulato, punctorum, intervallis elevatis et irregulariter vermiculatis . . ." and so on for several lines. True, a translation is given, but even that is more or less unintelligible to the uninitiated. Mr. Buckton descants on two new species of gall-aphids in the North-West Himalayan region, one a homopterous insect which forms smooth rounded galls on the twigs of poplars growing at an elevation of 9,000, in the Valley of the Yasin river, and one which forms large galls with a rough surface on aspens at Bunji, on the road to Gilgit. Mr. L. de Nicéville has a note on the "Potu" or "Pipsa" fly which attacks men and beasts alike and whose bite generally causes intense irritation and sometimes death. It attacks the ears and eye orbits, and it is reported that when the Chakrata-Saharunpur road was being constructed, numbers fo the work people died from the effects of being bitten by these flies. Tea planters will appreciate Mr. E. Barlow's careful descriptions of certain tea pests, accompanied as they are by a plato showing five different species. As regards miscellaneous tea pests, Mr. Barlow says that four species of moth-caterpillars, one species of beetle and two species of scale-insects have been reported during the past year as doing extensive damage to growing tea-plants in India, none of which are mentioned in Mr. Cotes's "Insects and Mites Destructive to Tea." Mr. Barlow adds:—"As regards remedial measures, in the case of the caterpillars, drawings of the parent moths and of the cocoons were forwarded to the parties interested, in order that the pest might be searched for, recognised and destroyed. In the ships of the Indian Marine, it is, we believe, found possible to keep down even such nocturnal animals as cockroaches, by set-

ting boys to catch them, and there seems to be no reason why the same plan should not be successful in the case of such large tea-pests as caterpillars, cocoons, etc." Among other interesting notes in this number are those relating to the mango weevil, insects infesting croton plants, ticks infesting fowls, and the reprints, especially that referring to the formation of new colonies by *Termes incifugus*, and the crow as an insect destroyer. The 60 pages of which this number consists contain a quantity of valuable and interesting information.—*Madras Mail.*

NEW AREAS OF CULTIVATION IN THE HAMBANTOTA DISTRICT.

There was but little new land brought under cultivation during the year.

In Magam pattu a tract of forty acres under Yodawewa was asweddumized.

In East Giruwa pattu Mr. Elliott, late Government Agent, Southern Province, commenced to cultivate the Walawe estate, but no new land was sown before the end of the year.

In West Giruwa pattu there was more land than usual cultivated during the year, but none of this was cultivated for the first time as far as I can ascertain.—*Mr. Hopkins' Administration Report for 1896.*

FOOD SUPPLY IN MATARA DISTRICT.

The paddy crops reaped during the year were fair average ones. The outturn was about the same as in 1895, viz., 750,000 bushels. This was supplemented by imported paddy for the estates and portions of the district to the extent of about 10,000 bags. The figures are practically the same as last year. In the Morawak korale and portions of the Kandaboda pattu the extent of land capable of irrigation is small, and the inhabitants have for years been dependent on fine grain of different kinds to supplement their food supply. These crops were average ones last year. There was however money to be earned for clearing and cultivating citronella estates, and the villagers were thus able to buy better food, and did not attempt to grow much last year. The crops of coconuts, jak, breadfruit, &c., were very good, jak and breadfruit being especially plentiful. Vegetables of the common sort are grown through most of the district, but not in large quantities, and taken to the communal markets, where they find a ready sale. Fish is taken by coolies to the markets at Tihagoda, Kirinda, Hakmana, and Kamburupitiya. There is practically no room for any extension of paddy cultivation. All available land has been brought under cultivation, and is in most cases assured of its water supply from one of the numerous tanks, anicuts, and channels with which the district is supplied. As regards coconut planting, I do not know of any large extents being opened. Mr. Le Mesurier has cleared and planted some land near Kotawila, and also inland on the edge of the Dediyagalamukalana; but native capitalists do not seem to care about opening anything but the very best land. This is scarce everywhere and even near the coast, where there is still unplanted land: most of it is condemned as unsuitable.—*Mr. Vigors' Administration Report for 1896.*

MOUNTING ENGRAVINGS.—Cut a piece of clean waste paper the same size as the engraving, and lay the engraving face downwards on a table or board, with the waste paper underneath. Now paste the back of the engraving until it is limp and saturated. The cartoon paper should then be damped with a sponge until saturated, and placed on the pasted back of the engraving. Press it down flat with a duster, put drawing pins or tacks round the edge, and leave for twenty-four hours. Trim off when dry. —*From Work* for July.

CROPS AND FOOD SUPPLY IN THE HAMBANTOTA DISTRICT.

Though the rainfall during the year was not above the average, the crops were fair, thanks to the different irrigation works in the district. The acreage under paddy and fine grain and the yield is estimated by the Mudaliyars as below:—

	Paddy.		Fine Grain.	
	Acres.	Bushels.	Acres.	Bushels.
Magam Pattu ..	4,384	87,780	380	3,012
East Giruwa Pattu ..	2,227	11,148	1,972	6,348
West Giruwa Pattu ..	10,830	130,646	3,572	17,864
Total ..	17,441	229,574	5,824	27,224

A good supply of vegetables is usually raised in the West Giruwa pattu, such as pumpkins, cucumbers, brinjals, &c. These are planted in the chenas in the same enclosures as fine grain, so it is not possible to form any estimate of the extent cultivated or the yield. It must, however, be considerable, for during the annual pilgrimage to Tissamaharama I noticed large quantities of vegetables, chiefly ash pumpkins, exposed for sale by the roadside between Ranua and Ambalantota. Of such vegetables there was a good supply, but coconuts, jak, breadfruit, and sweet potatoes were rather scarce owing to protracted drought.

There is an abundant supply of sea fish, which, however, is not made the most of by the local fishermen, who in their small boats are afraid to venture out to sea, and consequently the fishing grounds near the shore are overfished, and the number as well as the size of the fish caught is much below what it should be. During the north-east monsoon fishermen come in large boats from the Galle and Matara Districts, and during their stay catch large numbers of fine fish, the results of standing well out to sea and fishing water which is undisturbed by the local men.

Thanks to the large number of Mohammedans in the town of Hambantota, beef is generally to be had once or twice in the week, and the quality is very fair. At Tangalla, however, the supply is less certain, and the quality of the meat worse. Mutton is unknown, but goat meat is eaten occasionally by the better classes in the town. Fowls are scarce throughout the district, and ducks are never seen.

On the whole, the food supply during 1896 was amply sufficient for the wants of the people, and no complaints of scarcity reached me from any quarter. —*Mr. Hopkins' Administration Report for 1896.*

EXPLORATION AND CULTIVATION IN AUSTRALIA.—Winding up an article on recent exploration and loss of life on the Australian Continent, the Sydney *Mail* well says:—We are about celebrating the glorious reign which is the longest in our history. A feature, and not perhaps the least important, is that in the space of 60 years this vast continent has been surveyed from every one of its coasts through its remotest parts and now thanks to the bravery and the skill of thousands of pioneers, known and unknown, it is for ever dedicated to the occupation of mankind. Coolgardie lies beyond an explorer's "farthest." England receives the wool and perhaps the mutton and beef that are grown over the graves of Burke and Wills and the unmentioned resting-place of Leichhardt. We in New South Wales grow wheat where Oxley and Sturt gave no hope of human subsistence. The Australian desert has infinitely receded, but, as the fate of Wells and Jones denotes, there is a desert.

FOOD SUPPLY IN SOUTHERN PROVINCE.

The food supply of the people consists of rice, jak and breadfruit, coconuts, fish, yams, curry stuffs. The town population and the inhabitants of the sea-board consume Coast rice, and even in the interior local production is not sufficient for local requirements. Thus, in the large Bentota-Walallawiti korale it is estimated that two-thirds of the rice consumed was imported; in Gangaboda pattu one-quarter, in Wellaboda pattu three-quarters, while upwards of 2,000 bushels found their way to distant Hiniduma. [All paying 10 per cent., while locally grown rice was free of tax.—ED. *C.O.*]

Jak and Breadfruit.—These very important constituents of the food of the people were plentiful during the year.

Coconuts.—Probably the coconut industry is the most prosperous in the Province. It is steadily on the increase, but there is still a large extent of suitable land available. The supply of coconuts was abundant.

Fish.—The fishing season was a bad one, and the export to other Provinces contributed to the natural scarcity The fishermen attribute the bad season to adverse currents prevailing along the western and southern coasts. However that may be, the poorer classes suffered somewhat from the scarcity; but dried fish brought from Mannar and Batticaloa found a ready sale and helped to supply the local deficiency. From Ambalangoda quantities of fish are sent up-country, and last year "fancy" prices were realized as the supply began to run short.

Yams.—The villager can usually command an ample supply of this vegetable, but where he earns wages on tea, citronella, and sugar estates he does not take the trouble to cultivate it. Although the extension of the tea, sugar, and citronella industry supplies the villager with a money wage, it withdraws labour from native products, and in this manner affects the supply of home-grown articles of food.

One of our Mudaliyars says:—"The villager formerely cultivated his plot of ground with yams, fine grain, and vegetables, and consumed the produce of his own paddy fields." Now he labours on another man's land, and is paid "partly in advances of rice or of paddy, while for the other necessaries he goes into debt." He is, in short, being converted from a peasant proprietor in to an industrialist, and as such is becoming dependent on his purchasing power to supply his wants. As the process continues he will become more and more sensitive to fluctuations in the price of food, and unless he learns thrift will be substantially nearer to want than when rupees were scarce and he supported himself on the produce of his own land.—*Mr. Wace's Administration Report for 1896.*

TEA BULKING ON ESTATES AND IN LONDON.

MR. LIPTON'S FURTHER VIEWS.

In answer, specially to the representations in the *Observer* against his circular *in re* tea bulking in London, Mr. Lipton has had the following explanation drawn up and forwarded to Mr. Leake, a copy being placed at our disposal :—

London, E.C., 1st July, 1897.

W. MARTIN LEAKE, Esq., Secretary, Ceylon Association in London, 61-62, Gracechurch Street, E.C.

Dear Sir,—I notice various comments in the Ceylon papers upon my action regarding teas which have not been bulked in London and as no mention is made of the reasons that compelled me to so act, I would like to put the matter clearly before your Association.

I have had great cause to complain of the irregularity of many parcels both of Ceylon and Indian teas and have repeatedly found damaged teas in the parcels, such damage evidently having been sustained before the teas reached London.

I have had whole blends of tea completely spoilt through a chest of this damaged tea getting into a blending of tea, which could not have been detected unless each chest had been turned out and thoroughly examined. What this means in a large business like mine, it should not be difficult for anyone to understand, involving as it would do a great deal of extra labor and time, and especially when it is considered that each of my mixes consists of 2,500 lb. of tea. To have a mix therefore spoilt as just mentioned, means a most serious loss to me.

Whenever a case arose, where there could be no doubt of the irregularity and that the damage complained of had taken place and existed before the purchase, I would claim for the loss incurred, but how was my claim met even by sellers who admitted these facts and the justness of my claim? Simply by an expression of regret and refusal to admit my claim and a curt reference that they were fully protected against any claim of this sort after delivery of the goods, under Clause 5 of the Public Sales Conditions. These conditions of sale were framed when it was the custom to bulk almost every parcel of tea in London and there was less reason therefore for exception being taken to them by either of the contracting parties, but what are the circumstances now? Instead of the former custom, there has grown up a practice which seems to have become the general rule with Ceylon importers, not to bulk anything here, but to run the risk of buyers discovering any irregularity or damage in the teas before they leave the warehouses, and should the damage or irregularity not be discovered till afterwards, to repudiate any claim that may arise as abovementioned. No doubt they are legally entitled to so act, but surely it cannot be maintained that such action is treating the purchaser fairly. So long as this method of dealing with just claims prevails with sellers, it is small wonder if a purchaser resents it and endeavours to secure some protection against serious losses arising through negligence or carelessness of others.

It will doubtless be said that the teas are inspected before sale, but under the present system it is absolutely impossible to properly inspect even a large proportion of the packages that are put on sale every week.

You can quite understand therefore my reasons for preferring teas that have been bulked in London as I can them rely upon their practical uniformity, and in the event of country damage this is discovered when the teas are turned out. Notwithstanding this I would be quite agreeable to buy teas that have not been bulked in London, provided I had some assurance that any claim for irregularity or damage, when clearly demonstrated, would receive the due consideration and attention it fairly called for instead of being practically ignored, as I am well aware that bulking in London is an expensive operation which I would gladly assist the planters in saving; and, if they wish buyers to help them to effect this saving is only reasonble that the planters, on their part, should waive Clause 5 in so far as sheltering themselves behind its terms and refusing to consider or entertain any claim, the *bona fides* of which they are thoroughly satisfied with.—Yours faithfully, T. J. LIPTON.

It will be observed that Mr. Lipton now falls back on the risk of non-discovered damage to estate-bulked tea, and the impossibility under present rules of recovering anything against the said damage. On the other hand, in London-bulked tea, any damage is at once discovered in the bulking and the offending chest is marked accordingly. Mr. Lipton gives this as a good reason for his buyers preferring London-bulked teas; but in the last clause of his letter he offers to meet proprietors who care to have his competition for their estate-bulked teas, provided they are willing to make good any damage where such is shown, to their satisfaction, to have been sustained.

PLANTING NOTES.

Lemon-culture is extending (says a home paper) very rapidly in California. This year what is said to be the largest lemon-grove in the world has been planted near Colton, in San Bernardino County. It comprises 9,000 trees on 100 acres.

Cacao Cultivation.—The lesson taught by the experience of Mr. Van Starrex—see his letter elsewhere—would seem to be, to leave nature alone as much as possible in regard to the growth of the cacao tree—no handling or pruning whatever, at any rate for many years.

"Coffee Planting on the Shevaroy Hills" —is the title of an interesting, not to say flattering, description of the condition and prospects of coffee estates on that range, contributed to the *Madras Mail*, see our *Tropical Agriculturist*. "No leaf disease" and "five cwt. an acre of crop" is an experience worth going a long way to note in the present day in Southern India; but the contributor must have overlooked some drawbacks,—or, if not, how is it that Shevaroy planters do not make a fortune and clear out every ten years or so?

Coffee in Mexico, &c.—In San Salvador and Mexico coffee planters "are highly incensed at the low prices and do not wish to part with their coffee. In either country they have not shipped more than 25 per cent up to the present time. They are still making fully 100 per cent profit, as both countries claim that it costs them about 10 cents in silver to produce the coffee, which is 6 cents in gold in our currency, and they are still getting 12 cents. It is a pity that they are so dissatisfied with these 'miserable' profits, but it speaks volumes for the danger in which the article still finds itself. Even if some of the countries like Central America and Mexico hold back a part of their crop we believe that our estimate of 14,000,000 bags production for the present crop is a conservative one."—*W. H. Crossman & Co.*

The Decortication of Ramie.—A communication from the Board of Trade was submitted to the Manchester Chamber of Commerce enclosing copy of a letter received by the Department from Tourcoing, respecting a new method of decorticating ramie less expensive than that now employed. A sample of the decorticated fibre was enclosed. This was stated by the inventor to have been freed from the bark by a machine capable of turning out 500 kilogrammes of cleaned fibre per day under steam power, or 40 to 50 kilogrammes when worked by hand. It was ordered that the samples and the communication from the inventor should be exhibited to any inquirers interested in the cultivation or manufacture of ramie.—*L. & C. Express*, July 9.

The Rajakadaluwa District.—A coconut planter writes:—"The returns published recently of 107,000 nuts from 160 acres eight to eight and half years' old are magnificent. Only in the North-West parts of the island, I fancy, can such quick returns be expected, though exceptional soil and exceptional planting, as at Mirigama, may secure similar results; but, surely, the estimator had no experience of the district when he provided only for three-fifths of the actual yield. That is certainly erring on the safe side! Will trees that crop so easily last as long as those which are slower in giving returns?" If liberally cultivated, we should think there would be no risk—at any rate the neighbouring district can show very old, rich-bearing palms. As to the "estimate," more than one-third of the crop was got in the last picking, shewing how the trees had improved in the year. To estimate higher a year ago could not be justified to the time.

Ceylon Tea for Pekin.—It is of interest to learn that Ceylon tea is finding its way to the very capital of the Chinese Empire to be used in the British Embassy. Who could have dreamt of this when twenty or thirty years ago every drop of tea drunk in Ceylon was brought in "5 catty boxes" from China?

Cacao and Orange Cultivation.—There is food for reflection in more than one communication in our Correspondence columns: "Potts" in the Cacao Dialogue (see page 64, July issue) discourses on the sin of cutting off suckers or any branches from the cacao tree; while the successful orange cultivator in Queensland (a man with trees bearing up to 175 dozen fruits each in a year) declares he never prunes his trees nor disturb their roots!

A Fertiliser for Orchids.—MM. A. Hebert and G. Truffaut have addressed a short paper to the Paris Academy of Sciences regarding the withering which attacks orchids cultivated in hothouses. They have endeavoured to trace the cause, and have experimented with the *Cattleya* species. Analysis made by them on a series of these plants in 1891, 1893, and 1897, that is, from the moment of importation to the degeneracy period, proves that at the latter moment the orchids are poor in nitrogen, potash, lime, magnesia, and phosphoric acid. The remedy they suggest is a fertiliser containing exactly these matters. —*hemist and Druggist*, July 3.

Rhea Cultivation.—Mr. J. Cameron, Superintendent, Mysore Government Botanical Gardens, Bangalore, has published a short but interesting memorandum on the Rhea fibre plant. (*Bœhmeria Nivea*) with an explanatory plate. Mr. Cameron has, under the direction of the Mysore Government, raised large nurseries of this plant, and every facility, in the shape of grants of plants is, we believe, given to planters, ryots and others to extend its cultivation. In favourable situations the rhea plant will to a certain extent, run wild, and a good suggestion made in the memorandum is that endeavour should be made to make it replace the aggressive and useless *lantana*.—*Pioneer.*

Bengal or Nepal Cardamoms.—Two cases of this fruit, imported this year and marked "land carriage," were sold at 1d. per lb. at a recent drug-sale. The "Nepal" cardamom has not been seen at the public auctions for many years. At one time considerable doubt existed as to the plant yielding it, but the matter was cleared up by Dr. King, of the Calcutta Botanic Gardens, who came to the conclusion that the "Nepal" fruits were the produce of *Amoum subulatum*, a native of the mountainous parts of India. The fruits are of a dark-brown colour, three-valved, and coarsely striated, the seeds being arranged as in the true cardamom, but much more numerous, and held together by a viscid pulp. In India this product is generally known as the greater or larger cardamom, the Bengali name being "Bara-elachi." They are plentiful in the bazaars, and are valued at about 12r. per maund of 37½ lb. The seeds are aromatic and camphoraceous. They are employed in India as a cheap substitute for the true cardamom, and are largely used in the preparation of sweetmeats. An oil is also obtained from them of a pale-yellow colour. The fruit is an agreeable aromatic stimulant, and is applied to the eyelids to allay inflammation.—*Chemist and Druggist*, June 26th.

CACAO CULTIVATION IN CEYLON AND TRINIDAD,

We find in the Agricultural Society's Journal of this Colony, a very curious, as well as interesting return, in respect of the cacao cultivation of the island. It affords details as to the acreage, average crop, cost of production, the labour employed, total expenditure, etc. One heading baffles us as to its meaning, namely,—" Amount of importations per annum," the answer being given in " L. S. D."—The total result for 24 estates tabulated is thus given :—

COCOA.

The figures furnished by the Cocoa Planters show that the total amount spent in the Colony in producing 10,038 bags of cocoa is £17,025 or an average of £1 14 per bag of 165 lb.

The exports for 1895 amounted to 158,803 bags.

158,803 by £1 14 equal to £269,965.

Cacao Estates.	I. Total Acreage.	I. Aver. crop per annum.	II. Cost of production per bag.	VI. Number of Indentured Immigrants employed.	VI Number of free-residents employed. East Indian.	Creole.	VI. Outside labour employed.	XII. Amount spent in production of Cocoa per annum.	XIII. Amount of importations per annum
	Acres.	Bags—165 lb.	£ s d					£	£ s d
Talparo	394	650	1 11 6	Nil	8	19	6	941	4 6 0
Mount Pleasant	227	100	2 15 0	Nil	14	...	5	447	Nil
Montserrat	300	572	1 17 6	Nil	8	4	(a)	833	Nil
San Leon Grande	935	(b) 600	1 13 4	Nil	10	20	20	1153	Nil
San Louis	"	"	"	"	"	"	"	"	Nil
La Compensacion	571	1237	1 12 0	Nil	33	16	14	1795	Nil
San Jose	"	"	"	"	"	"	"	"	Nil
Mararaval	311	949	1 6 0	38	16	...	(a)	1250	600 0 0
La Carmelita	"	"	"	"	"			"	"
Esmaralda	550	464	3 15 0	15	19	34	100	1200	Nil
Adivinanza	520	(b) 350	(a)	(a)	(a)	(a)	(a)	(c)1342	50 0 0
La Gloria	"	"	"	"	"	"	"	"	"
Esperanza	744	349	2 1 8	Nil	30	(a)	(a)	687	Nil
La Deseada	600	940	2 1 8	Nil	6	0	80	1866	100 0 0
La Regalada									
San Rafael									
San Carlos	564	300	1 17 6	Nil	30	3	25	1237	300 0 0
Tierra Nueva	766	900	1 13 4	Nil	(a)	(a)	42	937	75 0 0
Caurita	"	"	"	"	"	"	"	"	"
Torrecilla	849	400	1 13 4	Nil	2	4	(a)	(a)	Nil
Ortinola	430	520	3 18 10	Nil	Nil	Nil	(a)	1808	Nil
Santa Estella	649	807	1 15 0	Nil	38	23	Nil	1395	Nil
San Francique	200	150	3 0 0	16	Nil	Nil	(a)	676	Nil
El Salvador	357	1500	2 5 0	80	2	0	80	800	100 0 0

(a) No returns. (b) Young cultivations.
(c) Includes cost of purchase.

Very recently Mr. J. R. Martin showed in our columns that "cocoa" could be produced in Ceylon at about £1 10s per cwt., and that 55s was, perhaps, a high average net price to put against this. In Trinidad apparently, the cost of production is only a little over 23s per cwt.; but then the value of the produce is distinctly lower than for Ceylon cocoa. Still, the Trinidad figures surprise us, considering the comparative dearness of its imported labour Perhaps, the explanation is found in the richness of the soil, and the little trouble cacao gives after being, fully established. Looking at the acreage and crops of each estate, we find that while several places do not yield, apparently, one cwt. per acre according to the return, yet there are others cropping up to $2\frac{1}{2}$, 2·86, 3·25, 4·57 and, in one case " El Salvador," to over 6 cwt. per acre. This is very fine: we suppose Dumbara Valley cacao fields at their best did not give more? The average yield for Trinidad is, however, not much above the 2 cwt. per acre estimated for Ceylon.

It is pointed out that we were unfair in our above comparison between the cost of cacao cultivation in Ceylon and Trinidad. For instance, Mr. J. R. Martin's estimate of £1 10s. per cwt. was f.o.b. for a crop of 2 cwt. per acre. A crop of 3 cwt. might therefore be put down at 26s. per cwt., and of 4 cwt. per acre at 23s. for cost of production. As regards net prices in London, too, Mr. Martin's 55s. per cwt. seems to more than oneinterested, to be very low, instead of high. We learn of one estate netting 60s., while a great deal of its crop sold at 75s. As to yield, the highest in Ceylon, we have yet heard of, is 7 cwt. per acre off a 21-acre field which had never been manured at any time and is still in excellent heart. To learn of an average yield for five years of an estate being 3·67 cwt. and the crop costing in Colombo only R20 (say 25s.) f.o.b., gives one a new idea of the profitable character, under suitable circumstances, of cacao cultivation in Ceylon. Still more, what will croakers say to an actual experience of an estate, not 100 miles from Kandy, giving last year 6 cwt per acre delivered in Colombo at R10 (13s.) per cwt.! After this, we shall certainly not be inclined to condole with proprietors of cacao property, but rather to congratulate them; although we may be as anxious as the most troubled of them, to see their Red (Caraccas) trees cleared of "canker," "fungus," or "beetle-borer" through the good offices or advice of the scientists.

In this connection we would call attention to a paper on next page by Mr. Hart of Trinidad, discussing and describing the different varieties of commercial "cacao" (*Theobroma Cacao*).

And once again, while on the subject of cultivation, we would inquire if any cacao-planters in Ceylon have experimented with artificial manures on their fields. If so, we should like much to know what their experience has been, and their opinions on the subject generally.

THE THOMPSON FIBRES COMPANY, Limited, has been formed to acquire from the British North Borneo Company the right to collect two indigenous fibres known as wild lamba, and wild or bastard Manila hemp.—*British Trade Journal*, July 1.

A GEOLOGICAL SURVEY FOR CEYLON.

A recent "Madras College Magazine" had the following deliverance:—

It will perhaps surprise many of our readers to be told that a geological survey of Ceylon has never been undertaken; but such is the fact. Rich as the colony is known to be in plumbago, in iron ore and in gems, the extent of its wealth has never been scientifically ascertained. The *Ceylon Observer* in an editorial points out that the great industry in plumbago alone would more than justify Government in appointing a survey. The exports of plumbago have developed from 28,823 cwt. in 1850 to 326,754 cwt. in 1895. "But," remarks the *Observer*, "the exploiting of plumbago deposits is done entirely by the Sinhalese without any scientific guidance. No one knows how great may be the rich deposits that a geological survey might bring to light within certain untouched areas; and as the Ceylon Government draws a royalty of R5 on every ton exported, it has a most practical interest in extending the industry." Nor have the gem deposits ever been surveyed or mapped out, though they are known to be very rich in some localities. Iron ore too of an exceptionally fine quality is to be met with in abundance in the island and it is believed that, with freights so low, it would pay to carry the ore to London and Glasgow to have it smelted and manufactured. What further mineral wealth might be found in Ceylon, were a survey to be undertaken, it is impossible to say; but plainly such an undertaking has been too long delayed, and it is to be hoped that at no distant date Government will set itself with energy and determination to make amends for its long neglect.

NOTES ON THE VARIETIES OF COMMERCIAL CACAO (THEOBROMA CACAO.)

BY J. H. HART, F.L.S.

(*From the Proceedings of the Agricultural Society.*)

The samples of Cacao to which I wish to call attention are one and all the produce of trees known to Botanists as *Theobroma cacao*. The different forms taken on by these species are, strictly speaking, varieties only, and not species as they are sometimes locally called. For instance, the well known "Forastero', is to be described as the same species as the old "Criollo" of Trinidad; the difference between the two forms being varietal only, and not specific. There are, however, other species of *Theobroma* besides *T. cacao*, among which are *Theobroma bicolor*, *Theobroma angustifolia*, *Theobroma sylvestris* and others; but, so far as I am aware, none of these produce the Cacao bean of Commerce. *Theobroma pentagona*, a species which is doubtfully distinct from *Theobroma cacao*, produces a very fine class of commercial Cacao, and is one of those varieties introduced from Nicaragua by me in 1893. These will probably show their character within the next two years. One plant at the gardens on which I was relying for the production of pods this year, has been unfortunately killed by the beetle borer, but I have the young pods in preservative fluid for examination, which clearly shows it to be a distinct variety, if not a distinct species. Common observation shows clearly that the variation in the form and colour of the pods of *Theobroma cacao*, is wide and distinct, for we see them in all shades of red and yellow, and some have been found with a milky white exterior, when ripe, while others are nearly black. If we examine the interior of the pods, and cut through the seeds, we again find a great variation of colour, ranging from white to a deep purple, and usually with a differing flavour in proportion to the amount of colour present in bean; the white being of the mildest flavour, and the purple strongest and most bitter. Examining the samples on the table we find that the Ceylon beans are the lightest coloured of all, and that this class of Cacao has a very mild and equable flavour. The variety called Caracas Cacao is seen to give a bolder sample than the Ceylon, is heavier, but possesses a similar though darker colour, other Venezuelan samples running it very closely. The nearest of our Trinidad samples to the Caracas type is that from San Antonia estate in the Santa Cruz valley. I have many examples of the different classes of Trinidad Cacao, some kindly selected for me by local firms, and some samples taken in European markets. From these it would appear that we have a very considerable variety among our samples, but the higher qualities are in a decided minority. The samples would appear to show that there has been little endeavour among the planters to select and grow upon scientific lines, the best and highest priced forms.

According to my observation the quality of Trinidad taken as a whole, has suffered some deterioration during the past ten years, and if the process goes on it will certainly be a matter of very serious moment for planters to face in the near future. I have no doubt that the prevailing contract system is to be held largely responsible for the existing qualities of Trinidad Cacao. The deep purple colour is certainly produced by a class of trees having greater vigour and vitality than those which produce the better and higher priced kinds; and therefore it is easy to see that the contractor who is paid according to the size of his trees, will invariably select those having the quickest growth. It has been fully proved by the importation of growing plants of Ceylon Cacao direct from that colony, that the class of Cacao there grown, is nothing more than the original "Creole" or "Criollo" Cacao of Trinidad, which is probably synonymous with that kind known as the Old Red Dutch on the mainland and in Dutch Guiana. There is but little Cacao of this kind grown in Trinidad at the present day, and some even may not he aware of its existence, but I had specimens kindly sent to me some time since, which were found growing wild in the woodlands of one of our remote districts. These gave white seeds, and a bean having identical characters with those imported from Ceylon, which have now reached their fruiting stage. I would not advise, however, that planters should grow this kind, for it may well appear that there are other and different kinds which would suit much better. What I would suggest is, that planters should pay more immediate attention to the quality of the cacao they use for seed, for it is clearly apparent that the cacao tree is no exception to the general rule, viz., that the quality of our produce can be readily improved, if care is taken in selecting seed from those trees only which bear produce of the highest quality. We have as yet undertaken no experiments to prove whether the cacao tree can be successfully budded or grafted; but should it be found possible, it follows as a matter of course that to produce an even quality of Cacao, would be a very easy matter indeed, for it would simply be necessary to select and grow the exact kind we may require from grafted plants. A great deal, however, may be done by the proper selection of seed, and I show specimens which prove that we can produce (if we carefully select our seed) almost any type of Cacao which it may be found desirable to cultivate.

To secure trees of a class which will produce beans from which a first-class sample can be made, our procedure must be somewhat as follows:—

1st—Never select seed from any tree but those giving Cacao of the very finest quality.

2nd—To give a vigorous constitution, we must take our seeds only from those trees having plenty of vitality.

3rd—To secure large yields, we should select seed from trees which regularly bear large crops.

From the mixed character of the trees at present growing on our estates, and the opportunity which necessarily exist in the fields for cross fertilization, there

would probably in the first instance be much divergence from the type planted, but by duly excising all the trees of the poorest kinds, we should eventually obtain a first class strain, and once obtained, such a strain would be of the greatest possible value, for it assuredly will be suited to our soil. Probably there are few planters who would be willing to carry out the measures which are essentially necessary in a work of this kind. Some may say we have at present all we require. One answer to this should suffice, and this answer is, that what can be done with one plant can be done with another. We have seen the yield of sugar in the beet, improved beyond all expectation, and we have very promising results in our seedling cane experiments, and we see daily in European countries that all varieties of agri-horticultural produce are being improved and made more productive, and it cannot, I think, be truly shown that it is impossible to improve West Indian cultures. If we do not look out and try and improve our produce in quality and quantity, we may wake up some fine morning and find that other countries are a long way ahead, and that the Cacao of Trinidad had lost its long held prestige. It is, however, fairly confessed that such work as the raising of improved kinds of Cacao, is work which is not suited to be carried out on private establishments, and can best be done in public institutions, which are not alone dependent upon what they realize by produce. What private planter would be willing to sacrifice half the trees in a plantation, because they did not yield the exact quantity, or quality, or grow with the desired vigour? Yet this is one of the most essential of the operations which would have to be carried out, if we are to succeed in quickly raising standard types of the very highest class. Work of this kind faithfully and properly carried on, is full justification for the existence of Public Establishments such as Botanic Gardens, Experimental Stations, Farms, or Schools, outside of the direct teaching they afford. Work of the same kind is done in Europe for the agricultural classes by the professional seed grower or raiser, who is well paid by the sale of seeds of any new thing he may raise, but as there is little hope of such institutions being commenced here, owing to small area, it devolves upon public institutions to supply the want.

If Trinidad Cacao is actually declining in quality, and if it is true that owing to the prominence of the bitter flavour, manufacturers are not able to use so much of it as formerly, it is high time that such work as the improvement of the quality of our produce should be commenced. There can, I think, be no doubt whatever, even from the few samples on the table, that Trinidad should grow generally a better quality of Cacao, and obtain a far better average price for its produce. Some may say, can we do it? I answer, it can be done. How are racehorses raised? How are Zebu, Shorthorn, Devon, and other breeds of cattle raised? How are Dorkings, Game, Cochins, and other varieties of fowls produced? How are new kinds of Tomatos. Peas, Corn, Cabbage, etc., raised? If not in the same way and under exactly the same principles; and there appears no good reason why we should not have high grade Cacao and proper establishments for producing it, and not to be *dependent upon the irresponsible contractor* for the kind of trees we grow and the sample we send to market. Improvements as a rule do not come quickly, and many persons would probably wax impatient, but it is easy to point out that similar institutions in other lands have fully proved their value, by the improvements effected in all classes of vegetable produce, and there does not exist, in my opinion, any good reason why they should not be equally successful in Trinidad. There are, I know. many points which might properly have been touched upon in a paper of this kind, which I have been compelled to omit; but I trust that in any discussion that may follow, these omissions may be brought forward, for it is but proper that every should one add his mite for the benefit of Trinidad.

NAMES OF VARIETIES EXHIBITED.

No. 1.—Puerto Cabello—(clayed)
No. 2.—Maracaibo
No. 3.—Venezuelan (clayed in Trinidad)
No. 4.—Ariba
No. 5.—San Antonio
No. 6.—Para } Brazil
No. 7.—Para } Brazil
No. 8.—Caracas
No. 9.—African
No. 10.—Ceylon
No. 11.—Bahia (Ecuador)
No. 12.—Guayaquil (Ecuador)
No. 13.—No. 2— } Trinidad.
No. 14.—No. 3— } Trinidad.
No. 15.—No. 4— } Trinidad.
No. 16.—Grenada
No. 17.—Grenada
No. 18.—Dominica
No. 19.—No. 1— } Trinidad
No. 20.—No. 2— } Trinidad
No. 21.—No. 3— } Trinidad
No. 22.—No. 4— } Trinidad
No. 23.—Special Trinidad (R.B.G.)
No. 24.—Trinidad (Cadbury)
No. 25.—African—via Hamburgh
No. 26.—Tiger Cacao (*Theobroma bicolor*,) Nicaragua
No. 27.—Nicaraguan Creole
No. 28.—Trinidad (blended) (R.B.G.)
No. 29.—Kola
No. 30.—Coffee (sample six years old)
No. 31.—Coffee (sample of 1896)
No. 32.—Mexican (R)
No. 33.—Java (R)
No. 34.—Carupano (R)
No. 35.—Puerto Cabello (R)
No. 36.—Guayaquil (R)
No 37.—Bahia (R)
No. 38—Trinidad (R)
No. 39.—(L.R.C.) Trinidad
No. 40.—Grenada (R)
No. 41.—Domiuica (R)
No. 42.—Para (R)

BRITISH CENTRAL AFRICA: NYASSA-TANGANYIKA PLATEAU:

CULTIVATION AND PROGRESS.

This plateau, from Karonga on Lake Nyassa to Kituta on Lake Tanganyika, is 240 miles long, the greater part of which belongs to the British South Africa Company. The Company have five stations on the road, viz., Nyala, Ikawa, Mambwe, Mpanga and Fort Abercorn. At each station there is a white man and twenty native police, armed with breechloaders. The plateau is from 4,000 to 5,000 feet above the sea-level, and is healthy enough for Europeans. I am living at Mambwe, having recently come here from Mpanga, eighteen miles off, where I have been since last May. There is a good garden and orchard. Bananas, lemons, guavas, oranges, strawberries, etc., all do well. The soil is fertile; anything almost will grow. All sorts of English vegetables do well, potatoes best of all. Wheat will grow well on the high ground. The London Mission grow a lot of wheat, and supply all the white people here with meal at 2½d a lb. Everyone could grow his own, but there are no mills in the country. Labour is plentiful and cheap—eight yards of calico a month. This costs about 5d a yard or less, and the men feed themselves. Their chief food is a small grain like poppy seed, called malesi, pumpkins and mealies. The Trans-Continental Telegraph is being pushed on as quickly as possible under Major Forbes, who is Administrator for this part under the British South Africa Company. It is a huge undertaking, from Salisbury in Mashonaland to Uganda. There is a weekly post both ways; a letter takes about two months to England, but delays often occur through the steamers on Lake Nyassa, and weather. I am glad to say we are to have horses up here soon. At present there is only one, and it has been here for over three years. I think horses ought to do well.—E. E. D.—*Natal Mercury*, June 18.

PLANTS AND THEIR HISTORY.—The first volume of an interesting work by Professor Ch. Jorets on "Plants: their History, Usages, and Symbolism in the Ancient and Middle Ages," has just been published. It refers to the Oriental world, and especially to Asia and Egypt. The subject is treated from the pharmaceutical, agricultural, alimentary, and other points of view in a very curious and exhaustive manner.—*Chemist and Druggist*, July 10.

CEYLON PLANTERS AND THE OPENING OF THE ANAMALLAI HILLS, COIMBATORE, SOUTHERN INDIA.

We learn that a Syndicate made up of prominent Ceylon planters has already secured a block of 2,000 acres on the Anamallai Hills. This Syndicate includes Mr. J. N. Campbell (Chairman of the Ceylon Planters' Association), Messrs. Norman Grieve, N. Rowsell, E. Hamlin, W. A. Mooyaart-Denison and D. Edwards and Dr. Renny; and our readers will recognise among these names men of high standing and great and varied experience. The land taken up has been the subject of a very favourable report; the elevation is from 3,600 to 5,200 feet; the rainfall is ample; the land itself excellent and very suitable at the lower elevation for coffee (Arabica) and higher up for tea. All this is very encouraging to such other planters as desire to take advantage of the offer now made by the Collector of Coimbatore to secure land from the large block of 80 square miles (51,200 acres) thrown open for selection. It is a great matter to have reliable experienced neighbours who, in this case, will no doubt pioneer the way with the products already mentioned and demonstrate how far a labour supply and means of transport can be relied on. In both respects, we feel sure that the Government of Sir Arthur Havelock will do all it possibly can to help Ceylon planters taking up and opening lands on the Anamallai Hills. The Governor of Madras knows well by experience the great advantage gained by the native population and the country generally through the introduction of British capital for the opening up of hill plantations. He has seen the results in Ceylon and has no doubt noted how comparatively little the general revenue of the Madras Presidency is benefited by the industry which has been the mainstay of the revenue and of the general prosperity of the community, in Ceylon. Then again, there never was a time, perhaps, when fresh and abiding sources of revenue are more urgently required in India than the present. Sir Arthur may feel quite certain of the approval of the supreme authorities both at Simla and in Downing Street, in adopting a policy calculated to give Madras a greater share of the prosperity which has attended the planting development of Ceylon. At first, Sir Arthur must know well that he will have to aid the planters with means of outlet—although this may be difficult just at present in view of the orders issued to him to suspend public works—and with such legitimate encouragement as can be given to ensure a due labour supply. If the Colleetor of Coimbatore and his subordinates have been duly impregnated with this view, the Ceylon pioneers should have a comparatively easy time; and surely, men taking up land on the Anamalais may be congratulated in continuing under the British flag as contrasted not only with those who go so far afield as Java and Sumatra; but also even with those whose property is situated in the Native State of Travancore. On the other hand, when once entered upon, cleared and planted, the Anamallai lands ought to be much more readily accessible to Ceylon planters, than are the Straits Settlements of Selangor and Perak, with their three or four days of voyaging from Colombo.

We cannot write on a matter of this kind—the development of planting enterprise in British Southern India—in anything akin to a dog-in-the-manger spirit. Nevertheless, we are by no means blind to the possible effect on Ceylon interests when further competition for cooly labour springs up. But facing the fact that large districts in the Madras Presidency are decidedly over-populated, we have no fear that when the surplus supplies are properly got at, there will not be enough coolies for both Indian and Ceylon planters, and these undoubtedly should have the preference whatever may become of planting colonies across the seas who look to India for indentured coolies.

DIMBULA VALLEY CEYLON TEA COMPANY LIMITED.

DIRECTORS' REPORT.—To be submitted to the Shareholders at the First Annual Ordinary General Meeting, to be held at the Offices of the Company, 16, Philpot Lane, London, E.C., on Thursday, the 8th day of July, 1897, at 12 noon.

The Directors have the pleasure to submit the General Balance Sheet and Profit and Loss Account for the year ending 31st March last.

The net amount at credit of Profit and Loss Account, after providing for general expenses, Directors' fees, and writing off £1,000 of the preliminary expenses, is £13,375 6s 2d.

Dividends aggregating 6 per cent. have been paid for 1896. *less* Income Tax, on the *Preference* Shares, amounting to ..	£3,000	0	0
Interim dividends aggregating 7½ per cent. on the *Ordinary* Shares have been paid up to 31st December, 1896, amounting to	7,500	0	0
It is proposed to pay a final dividend of 2½ per cent. on the *Ordinary* Shares (making 10 per cent. in all), which will absorb	2,500	0	0
It is proposed to carry forward to next year a balance of	375	6	2
	£13,375	6	2

For several months after the inception of the Company, by reason of legal difficulties in obtaining possession of some of the properties, the Directors were unable to exercise control over the working of the estates referred to. The exceptionally high rate of exchange ruling for the whole year and the loss sustained in supplying rice to the coolies, both consequent on the Indian Famine, constituted a serious deduction from this season's profits.

Notwithstanding these drawbacks, and the unforeseen expenses connected with the first year's working of a new Company, the directors have pleasure in recommending a final dividend of 2½ per cent., making 10 per cent for the year.

The Chairman visited Ceylon last winter, and reported most favourably on all the estates, and also appointed as manager Mr. C. J. Pattenson, a gentleman of great experience. The directors feel absolute confidence that the Company's interests in Ceylon are in safe hands.

The total area under full yield was ..	1,441
Mostly giving its maiden crop ..	250
Not in bearing, about	194
	1,885
To plant, say	25
	1,910

The total tea crop for the year was 801,629 lb., realizing the fine gross price of 9.22d. The average rate of exchange was 1s 2 9-10d.

Your directors having had the offer of Langdale estate, lying adjacent to the other properties of the Company, at the price of £22,000, purchased as from 1st April last, the vendors accepting in payment £12,000 in cash, and 1,800 ordinary and 200 preference shares. The purchase-price has been paid, and the shares allotted to the vendors. The conveyance having been completed, the Estate is now being worked on behalf of the Company. The

Directors consider this property a valuable acquisition. It consists of 272 acres of Tea in full bearing, and 31 acres of jungle, &c. The elevation runs from 4,200 to 4,500 feet above sea level, and its Tea-producing qualities are amongst the best in Ceylon. The crops have averaged about lb. 450 per acre, realizing from 10d to 1s, and your Directors are confident that, with the cultivation this property will now receive, crops equal to the other gardens will result. In order to meet this outlay, it is now proposed to issue to the holders of Ordinary Shares the balance of the fresh issue, viz., 1,267 Preference Shares and 1,133 Ordinary Shares. They will be offered to the Ordinary Shareholders at a premium of £1 per Share, in proportion to their present holdings, and notice will be sent with this Report.

NATAL TEA: BARROW GREEN TEAS.

Mr. John Fraser is again to the front at the Agricultural Show in Maritzburg this time as witness the following from the *Natal Witness*, May 29th :—

In our report yesterday we omitted to make more than passing reference to the excellent exhibit of teas by the Barrow Green Estate, which obtained a special and a v h c. The exhibit was in charge of the manager of the estate, Mr. J. Fraser, an experienced and enthusiastic planter, who though he has only been connected with the estate since February has succeeded in obtaining a grand sample of tea, this being an extraordinarily rich Golden Pekoe, of which 1 cwt. was shown. The tea in question was made in March, and without exaggeration it may be said that it will be extremely difficult to find any of better quality in the Colony, or even farther afield. So much is this particular tea sought after that 5s per lb can be readily obtained and was, indeed, obtained for a 20 lb. case yesterday. The Barrow Green teas are, it is pleasing to hear, gaining popularity every day, and there is a growing demand for them both in the Transvaal and the Cape Colony. Mr. Fraser is to be congratulated on the success which has attended his efforts.

MANUFACTURES SECTION I.—FOODS, EXTRA.

(3), Barrow Green Estate tea; h c, Stantial & Allerston, lemon squash, lime juice and cordials, manufactured in 1897 by exhibitors, 12 doz.; h c, W. Francis & Son, ginger ale, soda water, manufactured by S. S. Birch & Co. in 1897, 12 doz; h c, R. Derrett, mineral waters and ice, manufactured by exhibitor in May; h c, Hesom & Sons, Maritsburg, spiced beef; h c, Hesom & Sons, carcases, beef and mutton; c, Barrow Green Estate, tea.

A VISIT FROM THE "SUGAR ISLAND."

WM. SCOTT, ESQ., DIRECTOR OF FORESTS AND GARDENS, MAURITIUS.

Sixteen years without a change, is a long spell of work to put in, in a tropical colony like Mauritius, and this has been the experience of Mr. Scott who is now on his first holiday since, in 1881, he succeeded Mr. Horne at the head of the Mauritius Gardens and Forests. Mr. Horne paid two visits to Ceylon during his term of office, once in the "sixties" to carry back a consignment of the then precious "cinchonas" granted by the Ceylon Government, and once again in the "seventies" when on furlough. He was an esteemed correspondent of the late Mr. Wm Ferguson, F.L.S., and we have often quoted his writings. Mr. Horne, though retired on pension, cannot be idle and living in Jersey, he is giving his attention a good deal in that delightful climate to horticulture. No one would suppose that Mr. Scott, his successor, had been so long without a change; but then he is a hard-headed as well as athletic Aberdonian, and his work as Conservator of Forests must take him a good deal over the island and into the higher districts. Still, height is comparative, the highest point in Mauritius being under 2 800 feet from which the sea can be seen breaking on the shore all round the little island, and even Bourbon, 80 miles distant, be descried. As regards forests, Mr. Scott has only about 2,500 acres of virgin forest, covering the water-shed at the highest part, under his care; but a great deal has been done by Government in planting up with Grevilleas, Blue Gums and Casuarinas. The last-mentioned is the favorite tree with the sugar-planters which they put in on abandoned land for fuel. Besides this, little but sugar is attended to. There is no chance of the little experiment in tea, leading to any extended industry; a far more likely by-product would be cacao, suiting the deep rich soil (but not the hurricanes) and requiring far less labour than sugar. A good deal, however, can be said for the Mauritius planter confining his attention to the product for which he has provided very costly buildings and machinery and which, on the whole, best suits his rich soil. The troubles in Cuba should give sugar a "spurt" at present; but the fact is that Mauritius has almost become a Dependency of India in respect both of its imports and exports—most of its finest sugar goes to India from which it gets coolies and rupees. Part of the sugar, of course, goes to Europe and also some to Australia and America direct. As to total exports, we quote as follows, the latest figures to hand :—

In 1894 the weight of sugar exported was 139,449,413 kilos., with an estimated value of R28,672,008. The value of the rum exported was R424.697; that of vanilla, R82,720; that of aloe-fibre, R171,526; and that of coconut-oil, R187,116.

On landing from the B. I. steamer last July, Mr. Scott went at once to Kandy and became the guest next day of Mr. Willis at the Peradeniya Gardens. Two days later he passed on to Nuwara Eliya and visited Mr. Nock at Hakgala. He is delighted with the hill-country of Ceylon and felt elevated, standing in Nuwara Eliya 6,200 feet above the sea (no time to do Pedro close by with its 8,296 feet) as compared with the maximum 2,711 feet of his own island. Mr. Scott left a few days after for Europe by the B. I. ss. "Golconda" and it is satisfactory to think he carried away so pleasant a recollection of his visit to Ceylon.

RAMIE (RHEA CULTIVATION.

PRACTICAL EXPERIENCE.

The article on "Ramie" (this name is more generally familiar in Jamaica than "Rhea") reproduced in your May issue contains three important statements :—

1.—That India generally is not so suited for Ramie cultivation as has been supposed;

2.—That Ramie, when grown in some places there proved quite unfit for commercial purposes;

3.—That Ramie cannot withstand a drought.

1. One of the chief and most important arguments put to me, why Ramie is not likely to prove commercially successful in Jamaica, is that the enormous quantity which could be produced in India would soon swamp the market, and would be put in at a figure with which we could not profitably compete. The above article confutes this statement, and points out that only a comparatively small area in India is suitable for the production of Ramie on a business

basis. It must also be borne in mind, that any advantage India may have over us in this industry, so long as the preparation of Ramie for market remains essentially a hand process, lies in her cheaper labour, and that this advantage will be greatly reduced, if not entirely swept away with the advent of a successful decorticating machine. Then, aided by machinery, or proximity to market should enable us to compete with success. I venture also to suggest, that the innumerable uses to which Ramie fibre could be put, owing to the low price at which it could be produced with the aid of a successful machine, or process; underselling cotton, Jute, Flax, &c., and being capable of replacing all these to advantage, make it improbable that the world's supply should exceed the demand, at least in this generation.

2.—The second statement :—"It was then proved that the Rhea stalk of Saharanpur was usually *quite unfit* for conversion into fibre," is perhaps the most important, shewing that, although Ramie may be grown, it may at same time prove commercially useless. How are we to ascertain whether this is the case or not with the Ramie we are growing here, without putting same through a machine or process? It is most essential that one should be able to ascertain this before entering into extended cultivation. I must admit the growth of Ramie in my rough nurseries has been very unequal; the flowering stage varies greatly, some blossoming at 2 ft. high and others not before 5 ft. and upwards; it is therefore quite *possible* that if cut together as a crop, some difference in the quality of fibre might be apparent. The third statement by Mr. Baden-Powell "drought kills it outright" would *if correct*, show that Ramie cultivation, without irrigation would be a very risky one in Jamaica. What little experience I have had here tends to show that this statement is incorrect. I cut down my Ramie here on and after 19th January last. It is admitted we had this year one of the severest droughts ever known in this district; yet by end of March last, or in about two months with drought, I cut some stalks averaging 3 ft. 9 in. and over. From 27th April to first week in May last, I had my Ramie cut down, (that is what had not already been fed down by small stock, sheep and pigs.) On 19th May, or after about three weeks' growth, I cut Ramie measuring over 4 ft. This Ramie nursery is well established; say two years old. The cuttings, planted out during end of last year, died apparently from the drought. I feel therefore justified in expressing my opinion, that Ramie, *once thoroughly established in suitable soil*, will not only withstand a severe drought, but may also grow during dry weather although less quickly than usual. Mr. Allison, a well-known American authority on Ramie, supports this view in his pamphlet, where he states, in reference to a Texan Ramie Plantation :—"But early in July, 1889, "a drought began, which lasted nine weeks. During "this period, so great was the intensity of the heat, "that the soil was dried to a depth of more than "two feet. Hundreds of thousands of coffee plants "perished, but *Ramie* survived the drought, and, "quickened by the fall rains, grew with such luxuri-"ance, that often 150 stems were found in clusters "not more than two feet in diameter, etc." The article in your *Journal* does not state what variety of Rhea is referred to. My plants are of the "*Nivea*" variety or white under-leaf. As my seeds came originally from Mr Allison, I presume it is of the same variety he writes. My neighbour Mr. Craig, has, however, been growing the "*tenacissima*" variety, and as he has, since the drought, supplied me with growing roots, it is evident this variety can also survivo a drought. Dr. Morris in his late lectures did not touch upon these points probably because he saw no future for Ramie here until a satisfactory decorticating machine, or process had been made available. It would be interesting to hear the experience of others, who are trying Ramie in this country; as to its general growth, and power of withstanding drought.

SIDNEY MOXSY,

Suttons, Chapelton, 22nd May, 1897.

WORN-OUT COFFEE LAND IN JAMAICA

PROPOSED MANURIAL EXPERIMENTS.

In my evidence before the Royal Commission, April 1st, 1897, I stated that up to that time I knew of no manure, or system of cultivation that could bring back our exhausted coffee lands to a bearing state, and that unless something was found there would be no coffee cultivation in this Parish after the next 25 or 30 years. It must be understood that my statement referred to a larger cultivation than that of the peasantry which consists of a patch round each dwelling, and which is kept in heart by penning pigs, etc., and the usual household garbage; this I call garden cultivation, as contra-distinguished from a large cultivation, and I have no doubt that such a cultivation succeeds on old worn-out land, but I am sure that it would be impossible to cultivate, say 50 acres, in this way, therefore, if coffee cultivation is to be carried on on a large scale in this Parish experiments must be made with the various fertilizers on the market. I have spent considerable sums in manurial experiments but I am sorry I am still unable to say that I have found out the right sort. Unfortunately my trial of "Berts" Coffee Manures was a failure, owing to the unfavourable seasons during the last two years. Owing to Dr. Bernard Dyer's

ANALYSIS OF MY SOILS

I began to apply lime to my coffee trees, and although it was highly disapproved of by my fellow coffee planters, seems to me to have done good. It certainly made the trees grow, although there was no crop. I applied 30 barrels per acre but as lime in this quantity is difficult to get I doubt whether this mode of fertilizing is practicable (my experiment (?) took 9,000 barrels). Mr. Bert suggested Marl as a good cheap fertilizer so I went as far as to dig, sift and put Marl in heaps of a barrel, here and there all over my fields, but when I saw how poor the crop was last year, I thought I would wait till the trees bore a crop before putting it into the soil. My idea now is to carry out a scheme of exhaustive experiments with Fertilizers, keeping a strict account of all expenditure, cultivating highly, noting the effects of the different manures, rainfalls, weather, etc., and I intend parcelling out into quarter acre plots some ordinary common pasture land. My object in writing to you is, that I hope you will make my idea known to the various makers of coffee manures and if they think fit to supply me with enough to cultivate say a quarter of an acre, I assure them that their various fertilizers shall each have a fair trial and that I will supply them with all the information they may think necessary, and I shall be glad to receive any instruction as to the mode of application of their manures. I may say that I intend cultivating two quarter acre plots under any circumstances, one with applications of sifted marl and coffee pulp; and one with Bonemeal and 10 per cent of high grade Potash. The former being with the object of ascertaining whether there is any value in marl and pulper trash, (because if there is, every small cultivator in the Parish can avail himself of it) and the other, the Bonemeal one, I am trying on the advice of Mr. Robert Craig and others. It seems to me that there should be no hesitation on the part of the

MANURE MANUFACTURES

to give enough of their manures for these experiments on worn out land; because if any, or all, succeed in making coffee growing possible, *i.e.* with a margin of profit, there is an immense market open to all, as it is quite certain capital would be forthcoming to reinstate the thousands of acres of land which used to bear coffee in the days not too long ago; there would be every reason for the industry to be centred here as the land is "easy," and accessible and there are scores of old, thrown up coffee works that could be put in order for very small sums, and labour is plentiful and cheap.

I append an analysis of the soil I propose to put into cultivation made by Dr. Bernard Dyer in 1894. It was owing to his note attached to his analysis that I put lime to my coffee.

WALTER W. WYNNE.

Brokenhurst, Maudeville, 29 April, 1897.

COPY OF ANALYSIS OF SOIL I PROPOSE TO PLANT.

Silica and Silicates insoluble in concentrated acids	7.200
Alumina, Oxide of Iron and a little Manganese	63.333
Lime .. :	.485
Magnesia	.300
Potash	.066
Soda	.155
Sulphuric Acid	.075
Phosphoric Acid	.032
Water of Combination, Organic Matter, etc., etc.	28.355
	100.000
Nitrogen	.200
Phosphoric Acid Soluble in 1 per cent Solution of Citric Acid	·0008
Potash Soluble in ditto ditto ..	·0028

Note By Analyst.—This soil is poor in lime and would be benefited by a good application of it.

Note By W.W.W.—The soil is common pasture now but was in ruinate for more than 30 years till 1890.

FRUIT TREES AND COFFEE.

The following further communication from Mr. Wynne, dated 17th May, has been received:—Since writing to you on the subject of Worn-out Coffee Lands I have had the following work done upon the experimental plot:—I have weeded one and a half acres of Common Land at the cost of £1 11s 0d which was done by day labour. I lined and pegged out the land for planting, six feet by six feet, at a cost of 6s 10½d. Cutting the pegs for same (1,875) at 1½d per 100—2s 4½d. Planting bananas 12 x 12, say 406 bananas, 3s 6d. Cost of banana suckers at 4s per 100, 16s. Planting Seville Orange Trees at thirty feet apart, say twenty five trees, 2s. Carrying and applying seventeen barrels of old stable manure to the orange holes, 2s 1½d. Cost of orange trees, 3s. Cost of planting coffee 1,400 trees 12s. Cost of digging 1,875 holes 2 feet x 2 feet and 2 feet deep at 3s 4d per 100.—72s. I have given the land a top dressing of sifted marl, actually 387 barrels at a cost of £3 7s 10½d. There was also 6s spent upon a fence, a small sum as I only had to fence one end of the plot the other three sides being already built

It will be seen by the above statement that to hoe up the ground, peg, line out, and plant for the coffee, and digging the holes, (I had the coffee holes dug now, which I consider a great advantage, as the digging will ærate the soil, and in the subsequent weeding, between now and the time for planting the coffee, the weeds can be hoed into them) has cost, with the dressing of marl, £10 6s 9d. I have estimated that the cost of my nursery of coffee seeds will amount to 10s or 12s by the time the plants are ready to put out, it being my intention to plant the plants direct and not from suckers, whish is a great waste of time, say £11 for the acre and a half—or about £5 per acre if the cost of marling is left out. It may be considered that the cost of digging the holes (3s 4d per 100) is excessive, but I am convinced, by my own experience, that if big holes are dug, the plants can be established more thoroughly, and this mode is cheapest in the end. I am perfectly acquainted with the usual mode of planting and know all the evils of it,—a thrust or two with a hoe, and the hole made deeper with a crow-bar, or, more often, a hard wood stake, the coffee suckers jammed in, a stamp with the foot—and the planting is done. I have heard of even more primitive planting, viz: a hole made with a cutlass and the suckers put in. It stands to reason that planted in either of these ways the plants have but a poor chance of thriving. and I have long since given up the "Old Time" way, and now plant in *big holes*—holes two feet square and quite two feet deep. I am quite aware that this adds to the initial cost, but know that in the end it is a saving, and the field grows more regularly and the per centage of supplies is very small. I have before me as I write the cost of trimming, pegging and planting 60 acres which was just over £30. Also cost of 22 acres £11 16s 6d: to these sums must be added the cost of coffee suckers, say 1s 6d per 100.

Walter W. Wynne.

—*Jamaica Agricultural Journal* for June.

DRUG REPORT.

(From *the Chemist and Druggist.*)

London, July 1st.

Cinchona.—The cinchona-bark auctions held in London on June 29th were of fairly considerable extent. The offering comprised of—

	pkgs.		pkgs.	
Ceylon Cinchona -	3?7	of which	253	were sold
E. Indian cinchona -	1845	,,	1520	,,
W. African cinchona -	118	,,	118	,,
Java cinchona -	76	,,	76	,,
S. American calisaya -	135	,,	—	,,
,, cuprea bark	8	,,	—	,,
	2519		1977	

Throughout the auctions there was a very steady demand, almost all the agents buying a fair proportion of bark, and only a few parcels were bought in on account of the high limits placed upon them. A considerable part of the Ceylon bark, and several parcels of the East Indian, were imported between three and six years ago, and part of the Calisaya was landed in 1893. Druggists' barks were particularly well competed for. The average unit may be placed at ¾d to ⅞d per lb., but for some lots a full penny-unit was reached. The following figures represent the quantities of bark purchased by the principal buyers:—

	Lbs.
Agents for the Mannheim and Amsterdam factory - - -	78,763
Agents for the Frankfort and Stuttgart factory	66,220
Do Imperial quinine-works -	62,786
Do Brunswick quinine-works -	60,380
Do American ,, -	5?,560
Do Auerbach ,, -	49,968
Messrs. Howards & Sons - -	42,771
Various druggists - - -	29,125
Agents for French factory - -	18,000
Total quantity sold -	462,973
Bought in or withdrawn	125,285
Total quantity offered	588,258

The following was the range of prices paid:—Ceylon cinchona: Succirubra, natural chips 1d to 1⅛d; renewed ditto 2¼d to 2⅝d; Officinalis, natural chips 2d to 3⅝d; renewed ditto 2⅜d to 3⅝d; natural Ledger, stem chips, 3¼d per lb.

Citronella Oil is held for 1s 1½d to 1s 2d per lb., on the spot, in drums or tins. For arrival 11¼d per lb. c. i. f., for drums has been refused.

Quinine.—No business whatever has been reported this week. Practically all the German agents are now without quotations, though they still nominally quote a price, being unwilling to sell excepting in small quantities to special buyers.

Cinnamon Chips steady: ordinary coarse Ceylon 2¾d; quillings 9½d per lb.

Vanillin is said to have suddenly advanced, most of the manufacturers being temporarily unable to deliver. There has been a good inquiry for immediate shipment to America, one of the manufacturers, who was asking 3s 1d per oz. is said to have raised his quotation to 4s 6d. Others still quote 3s 5d per oz., but cannot deliver anything immediately.

Jubilee of the Ootacamund Botanic Gardens.—The Ootacamund Botanic Gardens celebrate their jubilee this year. They were opened during the Governorship of the Marquis of Tweeddale, in 1847, and now cover an area of about 51 acres. The object with which the gardens were founded was to improve horticulture in the Madras Presidency; to introduce vegetable productions not indigenous to India, and to further the distribution of seeds and plants. The gardens are estimated to cost more than 21,000r. for the present year, and the expenditure is progressively increasing.—*Chemist and Druggist.* July, 10.

SALT IN AGRICULTURE.

Pending a translation of the papers we have received from Germany on the uses of salt in agriculture, and the methods by which it is denatured, it may be well to observe that the present is only a renewal of a campaign which has been waged for many years, to induce the local Government to issue salt at cost price, or at a reduction, for agricultural purposes. Our Siyane Korale correspondent, we remember, was very strong, so far back as the "eighties," in urging the importance of salt as a manure for coconuts, in inland districts, especially those far removed from the influence of salt-laden breezes; and several past volumes of our *Tropical Agriculturist* bear evidence of his pertinacity and industry in pressing the matter on official and general attention. We were not aware, however, that the agitation then begun had been continued within the past three years; or, when we drew attention to the information brought back from Europe by the Hon. P. Coomaraswamy, that Government had been applied to so recently as March 1895 to sanction experiments with salt at cost price in coconut cultivation. But "F.B.", whose letter on the uses of "coconut husk and husk-ash as a manure" we give elsewhere, sends us, as promised, some important correspondence with the Colonial Secretary which has not been previously published, and from which we are able to judge of the attitude of our last Governor. During the administration of Sir Arthur Gordon, some attempts were made to move the Government to issue salt at reasonable rates for agricultural experiments; but the early years of his administration were so beset with financial troubles—our revenues having run down by about one-third within a decade—that Sir Arthur hesitated to touch any branch of revenue. It was pretty well known that he was favourable to Auditor-General Ravenscroft's propos l to do away with the present system of Arrack Rents; but the Government Agents had only to suggest that any change would result in a diminished revenue from arrack, at least for a time; and the Governor had immediately to let the matter drop! So, with any request at that time, that salt should be issued at a low rate for agricultural experiments—the suggestion that it might tell on the salt revenue was sufficient to ensure a refusal

A Veyangoda coconut estate proprietor, however, anticipated a more liberal policy when all anxiety regarding the revenue was at an end; and Sir Arthur Havelock had not the same excuse in 1895 as his predecessor had in 1887 for giving anxious attention to the immediate present, and refusing to hazard a rupee of revenue. But it is so seldom that officialdom in Crown Colonies can take a large and liberal view of things, or adopt a new line on any matter which has previously come up for consideration and been adjudicated upon. An illustration will be found in our Correspondence column, in the reply which "F.B." received to his modest and very reasonable application to the Government of Sir Arthur Havelock. In reference to this answer our correspondent writes to us:—

"I was more struck with the courtesy and the considerateness of tone, of the reply, than with its force or logic. My application was not, as the first paragraph might imply, for a gift of the salt. I offered to pay the cost price of the salt, or the price at which is sold for exportation As you are aware, salt cost the Government about 40 cents a cwt., and it sells it to dealers at R2·36; but it sells salt for export at R4·25 per ton, or 21 cents per cwt.!* So there was nothing unreasonable in the application. I admitted that the experiment was not undertaken from wholly disinterested motives; but it would cost me some money. I therefore wrote, 'I do not ask for a free issue of the salt, though if it were offered I should not decline it, as I shall have to incur some expense in connection with the experiments.'

"The reasons for the refusal set forth in the 2nd paragraph are transparently inconclusive. I offered to carry on the experiments, if necessary, on lines suggested by the Government, or under the direction of the Superintendent of the School of Agriculture; and nobody would expect the Government to issue salt to anyone and everyone who applied for it. It would be a sufficient answer to say, an experiment is being carried on and we are awaiting results; or, better still, salt might have been issued for experiments to half-a-dozen typical estates—typical of soil and climatic conditions, and typical of our different products; and then a more comprehensive and conclusive answer would have been available to charges of favouritism.

"The suggestion that a cooly, who would not use the salt himself, would pollute his hands with washing it clean, and would run the risks of an illicit sale—all for a few cents, as sodium chloride, though indispensable to human life has not yet reached the value of gold dust or uncut gems!—the suggestion, I say, is not one demanding serious refutation. Yet, I anticipated it, for I reasoned, on the assumption that the revenue would be defrauded to some extent, that the total loss would not be comparable to the gain to the revenue if the application of salt really benefited the soil and made it more productive. What would a few illicit sales here and there be, in comparison with the benefit to the people and the Government by the increase of crops even by one-twentieth, and by the protection of herds against the diseases which carry them away in such numbers?"

We are only surprised that the matter was not carried farther in 1895. Had the Correspondence been sent to us, we should have condemned the extremely illiberal and impolitic attitude of the government of Sir Arthur Havelock. We cannot believe that our present Ruler will content himself with following the precedent of 1895 or even ten and thirty years earlier. In the *Gazette* of May 1869 we find recorded a number of unsuccessful experiments made by Mr. Russell, Government Agent, Northern Province, under the direction of Dr. Charsley, P.C.M.O., to denaturalize salt, chiefly by the admixture of carbolic acid. Equally unsatisfactory were similar experiments by Mr. Macready—(son of the great tragedian, the "Willie" of Browning's well-known verses)—when Assistant Agent at Puttalam. But it was rather absurd to quote the failures of 1869, or the refusal—probably to Mr. David Wilson—of 1887, as precedents for Government in 1895. However, we are now likely to be equipped for the campaign in an altogether different way, thanks to the courtesy of Mr. Coomaraswamy and his friend Mr. Lange; and with the German law and practice before it, we do not think Sir West Ridgeway's Government will need much persuasion, to allow a trial at least to be made. Meantime, it is of value to have the Correspondence of 1895 placed before the public. We should also reprint the Reports of the Experiments of 1869 had they any practical value now; but we take it they are altogether too primitive in the light of the latest chemical science on the subject.

* What—at half the cost of manufacture—a dead loss?—Ed. *T.A.*

THE PLANTING OF RUBBER: DR. MORRIS ON THE ADVERSE SIDE.

Some little time ago, we gave advice to local planters in search of a new product for which the demand seemed likely to increase as years rolled on, out of proportion to the supply, to cultivate rubber, the Para variety for choice. We cannot help still thinking that, large as is the supply of the raw product from the forests of West Africa and South America, an extending demand will do more than take it all off and that the cultivated article should meet with a remunerative market. But we are bound to show the argument on the other side, especially when stated by so good an authority as Dr. Morris. We therefore give a recent strong utterance of his on the subject, as well as other extracts referring to activity in Bolivia, Brazil, etc., and we ask our planting readers to give all that is stated, due consideration. There is just one remark we would make on Dr. Morris's mention of cinchona, namely, that there is no risk of any planting community rushing into "rubber" as the Ceylon planters did, twenty years ago, into "cinchona." Rubber is not so readily grown, or at any rate not so soon and easily cropped as cinchona bark—a very material difference which must weigh with intending planters. On the other hand, rubber is a product which, if added to an existing tea or coffee or cacao plantation, gives very little trouble after being planted along roads, boundaries, or in fields by itself, till the cropping time arrives —so that the total expenditure upon it should be very moderate indeed.

Evidently recent words of warning as to abundant supplies of rubber must have told on the British capitalist; for a scheme which opened with a glowing prospectus of a "British India Rubber and Exploration Company, Limited," £200,000 capital, to acquire and develop 500 square miles of rubber-growing country, 35 miles North of Cape Coast Castle, has fallen to the ground. The shares were not subscribed for, and yet the Reports of experts pointed to profits of something like 30 to 50 per cent. Here are a few striking paragraphs from the prospectus :—

"According to Her Majesty's Foreign Office Reports, the consumption of india-rubber by six countries now exceeds one hundred millon pounds (lb.) per annum, worth in the market about ten million pounds sterling (£10,000,000); within the past 18 months the price of Rubber has risen enormously, as it is absolutely indispensable for cycle tyres, motor cars, cabs, and various other industries. It is a well-known fact that the consumption of Rubber in the manufacture of cycle tyres alone has reached prodigious proportions; and according to many competent authorities the supply of the raw material does not equal the demand. It is estimated that there are in England over one thousand cycle factories today, working at full pressure, and last year there were registered in London alone cycle and motor corporations giving a total capital of £19,898,000. Messrs. Bagot and Anderson estimate that there are at least four hundred and fifty thousand (450,000) trees yielding Rubber on the property proposed to be acquired by this Company, and the Directors contemplate making arrangements to plant a large number of additional trees, thereby providing for a future continuous supply. A very large proportion of the Rubber, at present being shipped from West Africa, is taken from the district in which this property is located.

"As it is estimated that there are some 450,000 trees on the property at present bearing Rubber, and as an average rubber tree yields a minimum supply of three pounds of India-rubber annually, which, at the very low estimate of 2s per lb. (and marketable Rubber is now selling at about 3s 6d per lb.), a gross Revenue should be earned from India-rubber for the first year of the Company's operations of £135,000 (*vide* report of George Bagot). The supply from an India-rubber tree is stated to increase 1 lb. per tree per annum for several years after the first year's tapping. Consequently, from the 450,000 trees, the Revenue for 1898 should be about £180,000 gross, again assuming that Rubber realises only 2s per lb. on the market in 1898. Marketable Rubber is now selling on an average at about 3s to 3s 6d per lb., so that in quoting 2s per lb. the Directors are placing a very low estimate on the sale price. It is the general opinion that the price will still further advance, and the press quotations given hereafter confirm this belief."

There can be little doubt that West Africa rivals the valley of the Amazon as a home for rubber; but year by year, the goose that yields the golden harvest is being used up and if the demand as seems likely, goes on increasing, we do not see that planters should be discouraged from putting in rubber, more especially as a by-product where they have plantations already formed of tea, coffee, or cacao, or even coconuts, as their staple.

COCONUT CROPS IN RAJAKADALUWA, CEYLON.

(*From a Correspondent.*)

I was amused at the criticism the remark about crop of nuts evoked. The reference to Kandaugomuwa was, of course, not made with a view of instituting an invidious comparison between it and the Rajakadaluwa place; but, as you pointed out, the interest was the age at which coconut palms properly cared for come into bearing in the two districts of which these estates are typical. As to the inaccuracy of the estimate being the result of the estimator's "want of experience of the district" I would propound the following question to the "planter" critic who I assume *has* some experience of the coconut districts in the N.-W. Province:—guess the average number of trees from which a crop of 108,372 nuts was picked in the year on a plantation 8 to 8½ years in the Rajakadaluwa district?

108,372 nuts were harvested for the 6 pickings in the year of which number as much as 63,492 were got in the last two gatherings (March-April and May-June.) The estimate was originally 65,000 (since raised to 95,000); but the forecast was made more than a twelve-month ago and the number of trees that came into bearing immediately afterwards was larger than was calculated upon, while the crop bearing capabilities of the palms which were then already in bearing also proved to be better than what was expected. Those who have had any experience in the matter know than an estimate of crop for a young coconut plantation *just coming into bearing* is at best mere guesswork. There are no data to go upon. To begin with, in making an estimate for the following twelve-month, the number of trees that will be in bearing within the next 3 months has to be guessed and when the palms are not uniform, this is not an easy matter.

MICA BOILER COVERINGS.

The increased use of electric power during recent years has led to a largely increased demand for mica for insulating purposes. But the producers of mica have not found in the electric demand any relief from the state of affairs which was a continual source of loss to them before it began. Large sizes and good shapes of mica, such as are required for insultation purposes, were always marketable, but the difficulty remained of disposing of the waste or scrap which forms so large a percentage of the output of mica mines and accumulates so rapidly at mica-cutting works. Through the ingenuity of Mr. H. C. Mitchell of Toronto, this waste mica has now a value though no doubt a small one as

compared with the merchantable sizes. It is being utilised as material from which to manufacture coverings for boilers and steam pipes to lessen the loss of heat by radiation, mica being a good non-conductor of heat as well as of electricity. The scrap mica blocks are first put through a series of corrugating rolls which loosen the laminæ; these are finally separated from each other by air currents, after which the sheets are again put through a process which corrugates them singly. They are then laid between light galvanised wire-netting, made into webs of a thickness suitable for the particular purpose they are intended to serve, and stitched with wire on a machine the first of its kind yet made. The flexible web of mica is covered with canvas stiffened at the back with millboard, and rounded into the desired shape. The covering when finished is fastened on the pipes by firmly lacing the edges together.—*Indian Planters' Gazette.*

THE ANGLO-CEYLON AND GENERAL ESTATES CO., LTD.

DIRECTORS:—Quintin Hogg, Chairman; Claude E. S. Bishop, Norman William Grieve, Alex. William Crichton, Managing Director; and Henry Kerr Rutherford.

Report of the Board of Directors to be presented to the stockholders at the eleventh annual ordinary general meeting, to be held at 20, Eastcheap, London, E. C., on Tuesday, July 20th, 1897, at noon.

The Directors herewith submit to stockholders their report of proceedings, together with the accompanying accounts for the 11th year of the working of the Company.

The net profit as shewn in the audited accounts annexed hereto amounts to £15, 15s 10d, and the directors recommended the payment of a dividend at the rate of 5½ per cent per annum on the Consolidated Stock of the Company. The dividend now recommended as above, will, if assented to by the meeting, be payable on the 3rd August 1897, at the London Office of the Company's Bankers.

In the autumn of 1896 the Committee of shareholders referred to in the last report of the directors, after making considerable enquiry and conferring with the directors of the Company, formulated a scheme for the reduction of capital, and re-arrangement of the shares of the Company. The scheme was duly laid before and unaimously adopted by full meetings of shareholders in December, 1896 and January 1897, and in due course it received the necessary sanction of the High Court.

The effect of the above changes was to reduce the capital of the Company to £250,000 Consolidated Stock, of which the old preferred shareholders were allotted £204,510, and the old ordinary shareholders £45,490, while the preferred shareholders received the dividends in arrear partly in cash, and partly in surplus certificates payable as therein specified.

New certificates have been duly prepared and are being issued in exchange for the old share warrants to bearer, as and when surrendered.

The name of the Company was also, pursuant to resolutions, adopted at the above meetings, changed from The Oriental Estates Company, Limited, to The Anglo-Ceylon and General Estates Company, Limited, and this change was officially sanctioned on the 26th April 1897.

In further pursuance of the policy already approved by shareholders, and referred to in the last Report of the Board, the directors have satisfaction in stating that the liquidation of the Highlands Company of Mauritius, which had been occupying their attention for some time, has made considerable progress during the past twelve months. A large area has been disposed of in lots to native cultivators and others, and there is good reason to hope that the remaining lands will gradually be taken up in a similar manner. The factory on this estate, which is a powerful one, and capable of dealing with a large crop, will, together with about 500 acres of selected cane land, be retained by this Company, and worked as a Central factory.

The quantity of sugar from the Mauritius Estates, amounted to 11,960 tons as against 12,066 tons in the previous year, the canes being reaped from a smaller area.

The tea crop in Ceylon during the period under review amounted to 1,743,824 lb., which includes 21,406 lb. from bought leaf, as against a total of 1,649,577 lb. in the previous year. The gross average price was 7·95 pence per lb. in London.

The cocoa crop was 1,346 cwt as against 1,390 cwt. in the previous year, and the price realised was 60/8 per cwt.

With the consent of the Trustees for the Debenture holders the outlying estate of Havilland in Ceylon, was sold as from the 1st January of the present year.

The results of the working of the estates in Ceylon and Mauritius respectively are given in the profit and loss account, calculated at the average rate of exchange of 1/2⅝, as against 1/1⅝ in the year 1895-6.

The directors have pleasure in expressing their satisfaction with the manner in which their representatives, both in Mauritius and Ceylon, have performed their duties under circumstances of considerable anxiety.

Mr. C. E. S. Bishop, a member of the Shareholder's Committee above mentioned, was on the 18th February last elected to a seat on the Board of the Company.

Many large shareholders have expressed a desire that Mr. S. C. Macaskie, the Chairman of the Shareholders' Committee, should join the Board, and a motion to that effect will be submitted to the meeting, and, if it is carried, the necessary alterations in the articles of Association will be laid before the extraordinary meeting of which notice is endorsed hereon.

In accordance with the articles of Association, Mr. Henry Kerr Rutherford retires from the Board, and, being eligible, offers himself for re-election.

The Auditors, Messrs. Welton, Jones & Co., also retire from office, and have expressed their readiness to act if re-elected.—By order of the Board,

HENRY GREEY, Secretary.

7th July, 1897.

SCHEDULE OF ACREAGES.

CEYLON.

Tea in bearing.	Tea not in bearing.	New Tea clearings.	Cocoa, Coffee, Cardamoms, &c.	Fuel Reserves, Grass Fields, &c.	Forest, Chena, &c.	Total.
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
5,260	1,100	413	1,197	1,144	3,328	12,442

MAURITIUS.

	Under Cane Acres.	Total. Acres.
Estates owned by the Company..	2,345	4,260
Estates in which the Company is Interested	3,257	7,310

DIMBULA VALLEY CEYLON TEA CO.

THE CHAIRMAN'S SPEECH.

Gentlemen,—In moving the adoption of this, our first annual report and accounts, which has been circulated amongst the shareholders, and has appeared in many of the public prints, I think I may safely congratulate you on your year's working, especially when all the circumstances and difficulties connected with our first off-go are taken into account. First we experienced difficulty in getting possession of two of the properties; secondly, we had an abnormal

high rate of Exchange, which ruled, I may say, from the date of drawing our first bill of Exchange; and then there was the scarcity of rice and of labour. I think, therefore, that it must be satisfactory to you to find that, notwithstanding these drawbacks, a substantial dividend is possible. We are now in quiet possession of the estates, which since January last have been managed by Mr. C. J. Pattenson, who resides on one of the properties, and gives practically his undivided attention to the Company's interests. I was fortunate in securing the services of this gentleman when I was in Ceylon last December. He is well known to most of your Directors, and I feel sure the Company's management there is in safe hands. During the first months Mr. Thomas Mackie acted, until we could appoint a permanent manager. Mr. Mackie is a gentleman of great experience, and was of infinite use in organising the Company's staff, and taking over the estates from the vendors. As I have stated, we are now in full working order. Exchange is more in our favour, and rice will soon be obtainable at lower prices, owing to a satisfactory monsoon. Labour, too, has been coming in more plentifully lately, hence most of our difficulties of last year are rapidly disappearing. To some, no doubt, it may appear lacking in caution to have commenced with so large a dividend as 10 per cent., instead of carrying forward a larger balance than we have done, but, deliberating on this point, your Directors had in view the gradual increase in crops, which will enable them not only to continue to pay similar dividends, but to gradually build up a substantial reserve. Ten per cent. is not so large a dividend as one or two of the lately-formed Companies pay, but in estimating the satisfactory character, or otherwise, of this, I would ask you to bear in mind the source from which your dividend is derived. Every acre you possess is of first-class soil. The estates are situated in perhaps the best district of Ceylon, at an elevation of from 4,000 to 5,000 feet, producing teas of a high class, as our prices for the year indicate. I consider the Dimbula Valley Tea Estates are amongst those holding a unique position in respect of the bugbear over-production, which some discern in the horizon, but, even if there is reality in that in the case of common teas, I think our's may have immunity. The area over which teas such as our's are used almost entirely for blending and for bringing up to a certain standard commoner teas, is very circumscribed. Indeed, it is practically already planted up, so that no extension of cultivation can take place. In fact, many people whose opinions are worth having, say that the more common teas there are produced, the more will be the demand for our's. Be that as it may, you have embarked in a concern which will hold its own in stability and ability to pay dividends. This year, in spite of our difficulties, we have a net of over 4d per lb., and, provided we get similar prices during the current year, the net for our teas will be nearer 4½d or 5d, and it is not difficult to calculate what a half-penny more on a million lb. of tea means. We have now a fairly good supply of labour on our estates, namely, 1,742 coolies, and, although our advance of 20 rupees per head is very much less than many estates, I hope to see some reduction during the current year. Langdale estate, which is in the same district as our other gardens, was offered to us at a price at which your Directors deemed it advisable to secure it. It is a property which yields similar tea to our other gardens, and is of first-class soil. The price paid was actually £21,000, half in cash and half in shares at £1 premium. Deducting the premium on 2,000 shares, the estate will stand in our books at £2,200, and should, judging from past figures, yield 12 per cent., should we only get similar crops. But the Directors are hopeful that, with the cultivation it will now receive, and the economy in being worked with the whole group, even better results will be obtained. The balance of this issue to meet the £12,000 cash paid to the vendor has been allotted pro rata to ordinary shareholders at £1 premium, and has all been taken up. I have pleasure in moving the adoption of the report and accounts.

PLANTING PROGRESS IN PERAK, STRAITS.

FROM ANNUAL REPORT ON THE MATANG DISTRICT FOR THE YEAR 1896.

ESTATES IN MATANG.—There are three coffee estates in the Matang district, viz :—The Jebong estate, with Mr. F. A. Stephens as owner and manager. The estate of the Straits Coffee Planting Company, under the management of Mr. Mac Gilvary. On the Jebong estate 165 acres have been planted. The young coffee on this estate seems to be doing remarkably well. Mr. Mac Gilvary has opened and planted about 80 acres. Both these estates are situated in low lying land, entirely different in every respect from the estates opened up at Waterloo, Gapis, Rumah Papan and Kamuning. The land appears very rich, and the managers sanguine as to results, which I sincerely hope will be more than justified. Mr. C. L. Gibson owns the other coffee estates, but he has so far only cleared a small portion and put in his nurseries. Tapioca has been planted by a Chinaman named Goh Hooi Chew to the extent of 692 acres. He has also planted 300 acres of coconuts, and has 8,000 more nuts ready for planting. There are about 20 acres of pepper in the district, the balance of the 80 acres granted to Haji Yusuf. Sugar has not been planted as yet, although the Stewart and Kennedy concession should have been commenced some time ago. This causes a great deal of trouble to the *padi* planters in the vicinity, owing to its jungle affording shelter to the pigs and vermin which destroy the *padi* all round.

PLANTING IN SELANGOR, STRAITS.

REPORT ON THE KUALA LANGAT DISTRICT FOR THE YEAR 1896.

LAND AND AGRICULTURE : EUROPEAN ESTATES.

The year has not been successful as regards European enterprise. Messrs. Maynard and Rendle were allowed to abandon the greater part of their block and are now taking up 300 acres of fresh land in its place. Similarly, Mr. Borring found himself compelled to abandon his coffee planted alongside the road (amounting to several acres), though I am glad to say that some fifty or sixty acres at the back of his estate near the river bank appear to be really good, and are growing what is generally admitted to be some of the finest coffee in the State. At the end of the year Mr. Borring applied for, and obtained, about 120 acres of good land adjacent to his estate. Mr. Orchard, who had purchased a block (No. 51) on the Klang Road, was permitted to exchange his land for a block of similar area in Klang district. Finally, Mr. Bernard, who was granted 1,000 acres of land near the eighth mile on the Klang road, abandoned his land entirely, and has, I hear, taken up land in Sumatra. The main cause of this want of success was no doubt insufficient prospecting. There is an abundance of really first-rate land at Telok, as in other parts of the district, but it requires more careful prospecting than it has had hitherto. On the other hand, signs are not wanting that low-water mark has been passed, and, with a fresh start and better luck, I am confident that a really bright future will be in store for this hitherto backward part of the State. Thus, at the time of writing, I have just received a letter applying for a thousand acres of land on the Klanang Road, where the soil is known to be excellent, and where the 18-foot road, when gravelled (as it should be next year), will materially assist the development of this part of the district, whilst yet other land in the same neighbourhood is being prospected by applicants who desire large areas.

CUSTOMARY HOLDINGS.

The total area of customary holdings on the mukim registers for 1896 was 6,255 acres 1 rood 33 poles. The total area of land applied for was 2,195 acres 2 roods 11 poles. The total area of land demarcated, 1,636 acres 3 roods 22 poles. The total area of land issued under extracts from register during the year was 546 acres 1 rood 39 poles.

There were 32 mutations of customary lands during the year. An area of 1,051 acres 2 roods 13 poles was demarcated at Klanang, but it was not possible to prepare the extracts and to bring them on the rent-roll before the end of the year; there will, however, be an exceptionally large addition to the rent-roll in 1897. To enable land work in this district to be brought up to date and in accordance with the new instructions issued a special clerk for land work is required. The new settlers at Klanang are almost exclusively Javanese, who form our best colonists, and are still the pioneers of planting in localities yet unprospected by Europeans.

PROGRESS OF CULTIVATION.

COFFEE.—Coffee is still the rage among native settlers, and during the year the whole of the road-side as far as Morib, nearly ten miles, has with a few unimportant gaps been taken up for the prevailing coffee-culture, which is rapidly converting this part of the district into one vast garden.

It is an especially healthy sign that many of the proprietors of bright green patches of lalang by the road-side have at length awoke to the fact that their property has a value, and have commenced to cultivate it. The demand for land has been growing perceptibly brisker for some time past, and an acre of coffee at Klanang now realises something not very far short of Klang prices.

In October I received on a single day 38 applications from Chinese for land at Tanjong Duablas, whilst in December I received also on a single day 44 applications from Malays for land at Telok Goujeng, a portion of the big island opposite Jugra, which has hitherto been occupied solely by Sakeis.

As an example of the universal coffee-fever, I may remark that near Sepang there is a small plot of ground which some Sakeis have started to plant, and on which they have built the small thatched hamlet in which they reside.

PEPPER AND GAMBIER.—Cultivation of both these products has been practically at a standstill on the Sepang estates owing to the prolonged absence of the manager, to which reference has already been made. Neither pepper nor gambier is a species of cultivation which it would be wise to encourage in future without making some stipulation as to the planting of shade-trees.

COCONUTS.—The area taken up for this form of cultivation has not increased during the year, though there is no reason why it should not do so, the soil near Morib being especially well adapted to this form of cultivation. Some of the best coconuts I have seen in the State are to be found close to the sandy beach at Morib, and there must be at least 30 or 40 miles of sandy coast in the district on which they would flourish exceedingly.

REPORT ON ULU LANGAT DISTRICT, STRAITS, FOR THE YEAR 1896.

LAND AND AGRICULTURE.—A great demaud has sprung up for agricultural land in the Kajang mukim due, to a great extent, to the advent of the railway, which has also had a marked effect on the value of town lands, vacant building lots having risen 100 and 150 per cent. in value during the past twelve months. About 80 per cent. of the customary land applied for during the year has been selected for the purpose of Liberian-coffee cultivation and practically nothing else in the shape of permanent crops is receiving attention in any part of the district. Further impetus has been given to this form of agriculture by the influx of more European capital, six blocks of 320 acres each having been alienated to European planters during the earlier part of the year. The total area under cultivation on all estates under European management amounted, at the close of the year, to about 1,200 acres.

WILD ANIMALS IN SELANGOR.

Mr. Walter D. Scott, Acting District Officer, Kula, Selangor, reports:—One tiger, four panthers and 180 crocodiles were killed during the year, the rewards for which amounted to $256·25

REPORT ON ULU SELANGOR DISTRICT, STRAITS, FOR THE YEAR 1896.

LAND AND AGRICULTURE.—3,925 acres of customary lands were given out as compared with 1,644 in 1895. The average price at which customary lands changed hands was $25·58 an acre. The average price in 1895 was $18·27, and this increase is I think one of the most satisfactory signs of progress and prosperity I have to record. At present there are only two estates, both of 320 acres, held under title. Three more of a like area are in process of alienation. Of the two held under title one, at Batang Kali, belongs to Messrs. W. Meikle and H. A. Hamerton, and was originally taken up in 1894. A considerable portion of this estate is now planted with coffee. The other, held under permit by Mr. J. Pasqual, is now fully planted up with coffee. Four other blocks, extending to an area of 460 acrees, have been applied for, but pending survey it has not been found possible to issue titles for them. Nearly all the lands opened during the year have been planted with coffee. I am agreeably surprised to note how clean and clear of weeds the large majority of native coffee gardens are. It would probably be a great benefit to cultivators and Government alike were there an officer available who had a good knowledge of coffee cultivation, and who could be spared to go round all the native holdings and give advice. I find that most of the cultivators are only too anxious to be instructed. One hears a good deal against the native practice of planting padi and other auxiliary crops amongst their coffee during the first year or two, and it is occasionally recommended that this should be altogether prohibited, but to prohibit it is to prohibit a number of new settlers planting coffee at all, as there are very few native immigrants who came to the country with sufficient capital to live on until their coffee plantations come into bearing. Under instructions from the Government I held a meeting, on 6th June, of all the penghulus in the district to discuss what could be done to encourage and increase the cultivation of padi. They all seemed very anxious to see more padi planted and suggested many irrigation schemes with this object. I have no doubt that the cultivation of padi could be very largely increased, but the Government must be prepared to allow (1) a considerable sum for irrigation works, (2) security against disturbance by miners, and (3) a sufficient land office staff to supervise operations.

BRITISH CENTRAL AFRICA COFFEE.

We have received from Mr. Duncan (of Messrs. H. J. Gardiner & Co.) some statistics of the past season's coffee crop. The best price ever obtained for B. C. A. coffee was in the past year, viz., 114s 6d, obtained by the firm of Buchanan Brothers for several parcels of peaberry. The average price of the whole crop consigned to Messrs. Gardiner & Co., was £86 6 8. The highest average price got by any one shipper was obtained by Mrs. A. Waller, viz., £97 6 8. On the whole, Mr. Duncan considers that this year's figures are distinctly good when compared with the results from other countries.

Mr. Duncan states that they are looking forward to a large crop this year, and if it is despatched early enough to reach London in time to be sold in October, it should again fetch splendid prices.—*B. C.A. Gazette.* June 15.

TEA PICKERS IN FORMOSA.

Between April and August tea picking constitutes one of the sights in Taihoku (Taipe). Just as in the interior of Japan, the tea pickers are girls and women, all of the lower classes. Generally girls constitue six-tenths, married women three-tenths, and unmarried women and children one-tenth. In one respect the Formosan tea-pickers surpass their sisters in Japan proper. In every tea district in the interior whether in Shizuoka and Uji, or in Yokohama and Kobe, the tea pickers are not remarkably careful

about decency Such is not the case in Formosa, in consequence of the long established social restraints concerning manners and customs of women. The Formosan tea-pickers are neatly dressed, often in full toilette, while old and young generally fasten in their hair sprays of fragrant flowers. Therefore when one visits a tea plantation in the season he will inhale an atmosphere deliciously scented from the leaves and the head adornments. The Formosan mothers are also more considerate about their babies. They do not go about working with their little children fastened on their backs, as their Japanese-born sisters generally do both to the inconvenience of mothers and babies. When they happen to come to work with their babies, the latter are quietly placed in large beds made of bamboo provided for the purpose by the tea planters, before the mothers go to work. Thus may be seen even as many as twenty or thirty babies in one bed. The Formosan tea manufacturers do not feel any inconvenience at all in the matter of the supply of hands. There is an abundance of labour in Taipe and its vicinity for the purpose, and the people flock to tea plantations as soon as the season commences. The process is simple, girls or women employed the previous season resort to their old plantations and bring with them new recruits. No advance is asked for or paid, and as their wages are paid every day after the work is over, pickers are perfectly free to continue or discontinue work. The number of tea-pickers in Taipe, or more strictly Daitotei (Twatutia), alone is something enormous. There are a hundred and sixty tea manufacturers in Daitotei, large and small, a large firm employing more than two hundred and fifty and a smaller one about forty. Putting the average at eighty, the total number of hands for the whole of the tea manufacturers amounts to 12,800. Pickers are generally divided into three or four classes, according to their skill, and wages are paid accordingly. The 1st class pickers receive 40 *sen* a day, the 2nd class 25 *sen*, and the 3rd class 10 to 15 *sen*. But wages are also paid by results of work, at the rate of 30 *mon* (1 *mon* corresponds to 1 *rin*) per *kin*, or 5 *mon* per basket, according to plantations. It is not difficult to pick 10 to 14 *kin* or 60 baskets, a day, working from about 7 a.m. to 5 p.m. Of course no particular training is needed; a month's picking will make a girl a first class picker, provided she is endowed with ordinary intelligence. Therefore little girls of fifteen or sixteen years old, whose hands and eyes are quickest, get in general the highest pay; next, women in their "twenties," and lastly old women or children. When these have picked a sufficient quantity they deliver the leaves to overseers, who give them in exchange bamboo checks or tally-sticks, one per *kin*, and after the day's work is over the checks are exchanged for cash. Supposing that a tea-picker gets on an average 20 *sen* a day, an estimate that is most likely below the mark, the wages paid in Twatutia alone to 12,800 girls and women aggregate 76,800 *yen* a month. These are the good features of tea-picking labour, but unfortunately there is also a bad side, that is to say, corrupt morals of tea-pickers. For at least a third of the total are little better than strumpets or unlicensed prostitutes. The peculiar circumstances of life on tea plantations are the main cause of this moral corruption; the tea industry gives employment not only to girls and women but also to a large number of men. Therefore when the season begins, the ingress of labourers to Taihoku is considerable. Every junk or steamer brings to Formosa hundreds of these labourers from the opposite coast of China. In Taihoku alone at least three thousand labourers, mostly from Amoy and Swatow, arrive each season. They are men of low class, whose only desire in coming over to the Formosa tea plantations is to earn a little money and gratify their animal passions at opium shops and brothels. Under the circumstances, it is not unnatural for ignorant girls, eager to get fine clothes and knick-nacks, to be seduced into secret prostitution, for procurers are plentiful in Formosa as in any other part of the world. Indeed it is a common thing in Formosa for girls of low class to sell their virtue for money, not unfrequently with the encouragement of their parents. Married women are also guilty of the same offence, though proportionally less as compared with the others.—*Japan Times*, July 2.

JAPAN TEA CROP.

Owing to several unfavourable circumstances which we have noted from time to time, it was generally believed that the total output of tea this year would be far smaller than in ordinary years. The latest return shows that the total amount of tea sold in Yokohama before the third instant, is estimated at 1,396,150 catties, showing a slight decrease of 32,650 catties compared with the amount sold up to the corresponding date last year, while the total now in stock amounts 687,000 catties, that is, 107,200 catties less than that of last year, the total decrease being 139,850 catties, which is a much smaller difference than was expected. Such being the state of the tea market at present, it is generally believed that the export of tea will reach 22,000,000 catties this year. —*Japan Times*, July 10.

PLANTING NOTES.

PARA RUBBER IN NORTH BORNEO.—We are interested to hear from Mr. H. St. J. Hughes of Labuan that he has two Para Rubbers doing very well in his garden—young trees in pot which he is sending up to Mr. Keasberry at Sapong to plant there. He has also given one to Mr Hewett to plant in the Government House gardens and one Dr. Adamson has planted in his garden in low ground by the Calaghan Road so they will be able to speak with authority with regard to the tree doing well in Borneo before long.—*B. N. B. Herald.*

RED ANTS: A WARNING TO CACAO AND OTHER PLANTERS.—We direct attention to the important warning Mr. E. E. Green sends to his brother planters through our columns in reference to the "red ant." It has been drawn forth by the statement to us of a lowcountry planter that he was in the habit of carrying the red ant to his cacao trees in order to get rid of various minor insect pests. Mr. Green shows, however, that the risk of introducing other and worse enemies is too great; and we fancy our friend will after reading this letter, deem it wise to suspend operations.

MANURES FROM INDIA.—A correspondent writes to a contemporary:—"I enclose a chance cutting from the *Times of India* list of exports for one day this month which shows the brisk export of bone manure and oil cake now going forward from our Indian ports. The bone meal—2,000 cwts.—for Hamburg—is no doubt being sent to Germany for the beetroot crop raised under the bounty system by every device known to agricultural chemistry to the ruin of our West Indian cane sugar interests. If the Government of India had more, in fact a grain, of the science of agriculture in its composition, there would be an export duty put without delay on all items of plant-food before they were allowed to be taken out of the country to the impoverishment of its soils and deterioration of every British interest. This would not be open to the objections applying to export duties of an ordinary kind on raw produce. With the state the Indian soils are in there is no bone dust or oil cake whatever to spare for the enrichment of the land of countries outside.

FOR ALL INTERESTED IN "TEA."

There is a great deal of instructive, if not practical, information in this issue of the *Tropical Agriculturist.* First, we may call attention to the letter of our old contributor, Mr. John Hamilton, who, to experience as Ceylon planter and estate proprietor, has long added that of a London merchant and expert. Mr. Hamilton has always proved a good friend to Ceylon planters, and they will think all the more of him if his surmise in a private note to us, proves true when he says:—"It seems probable that we have now reached the end of unsatisfactory (tea) prices for the present." But to turn to his letter *re* the Bulking and Packing of teas, it will be observed that Mr. Hamilton throws quite a new light on the situation. He avers that much of the trouble arises from *overpacking* and occasional carelessness in refiring, on the part of the Ceylon planter. The temptation to get as much tea as can be squeezed into each chest is, it seems, a very real one with some of our Superintendents and mischief results in several ways as pointed out by Mr. Hamilton. The latter is even doubtful if refiring does not do more harm than good; while he is strong about the unequal gross weight of packages in a break. We commend the letter to the careful consideration of planters and should like to hear what "Senex" and some others think of it.

We have next to draw attention to the valuable review—given on page 195—by the *Investors' Guardian* of July 10th of the working of Indian and Ceylon Tea Companies for 1896, with reference to their value as an investment. Our contemporary has taken considerable trouble in the matter, and, as a leading Colombo merchant writes to us, "the article is well-written and the figures appear to have been carefully compiled." The comparisons and results cannot fail to attract considerable attention in this community. The surprising fact brought out by this examination of the accounts of 94 Tea Companies is that the total result shews a larger net profit for those belonging to Ceylon than for India, though "Ceylon teas do not reach anything like the high-water mark of the best Indian Companies." The highest average in the case of an Indian Company is 12·45d for the Assam, the net profit being 20 per cent on the ordinary shares; while in Ceylon, our highest average is 10·30d for the Nuwara Eliya Co., the net profit being only 6 per cent. But the *Guardian* editor should really have had a note to say that 1896 was the very first year of the latter Company and could therefore scarcely be taken as a fair criterion. At the same time there are high average (12·18d or 10·75d) Darjiling Companies which only pay 6 and less per cent. Nevertheless, the Indian Companies with fine teas show the highest percentage—11.62 p. c. as compared with 7.48 p. c. (medium class) and 9.17 low-class teas; while in the case of Ceylon the result is quite the reverse, the high-class teas averaging only 9.10 per cent. against 12.5 for low-class teas and 9.90 per cent for "Not classified." This is a matter which surely requires to be looked into in Ceylon, or the reputation of Companies owning high estates must be affected. As the *Guardian* says, "the Companies in Ceylon which have produced tea below the average of 8.25 d per lb. have given a much better result for the investor than the better class, the percentages being 12·5 for the former and only 9.1 for the latter." We await the further article of our contemporary on the subject with considerable interest.

We have further to note the good feeling manifested at the annual meeting of the Indian Tea Association in London as to the joint Tea Campaign in America and the confidence felt in the good work done through the Agency of Messrs. Mackenzie and Blechynden. The *Grocer*—ever snarling at Indian and Ceylon, and unduly praising China, teas—has been at its old game it seems, while the editor also deprecates any further reduction in the British tea duty. Both this question and that of "bulking" are likely to be the subject of consideration shortly by Committees representative of tea interests in India and Ceylon.

THE TRINIDAD GOVERNMENT STOCK FARM.

The working of this establishment for the past year (1896) is reported to have been a moderately successful one. The following are some particulars relative to the dairy. The total output of milk was 133,151 quarts; the daily average number of cows milked was 64, and their yield 5·55 quarts per day. The yield, which is apparently less than in 1895, is said to be due not to any fault of the cows, but to the Colonial Hospital suddenly discharging its inmates in the middle of the year for the purpose of clearing the building, with the result that the demand for milk simultaneously ceased! On this account as many cows as possible were dried off to save feeding. The yield of the milch cow is regulated by the quantity required by the medical institutions. Any surplus after meeting these demands goes to the calves. As regards the feeding of the cows, rye meal was supplied all through without any ill-effect. With it was mixed "middlings" (a fourth crushing of wheat), cotton-seed meal, and coconut meal. The actual cost of the food, 8 lb. per day, is about 10 cents. The health of the cattle was satisfactory, the total mortality being 7 head, that is 1 cow, 1 bull, and 5 calves. The following remedy for ticks is recommended by the Manager:—2 gallons coconut oil, 1 quart kerosene, and sufficient Stockholm tar to colour well. This mixture will dress 20 head of cattle at, say, 3½d per head, if they are not too much troubled. It has to be well rubbed in with a piece of old sacking all over the animal. The price of milk in Trinidad as sold to the hospitals is only 5 cents per imperial quart.

We have referred at some length to the dairy as being that part of the Trinidad Stock Farm which is of most local interest, but it should be noted that the breeding of cattle and horses is successfully carried on as well. In writing to us, the Manager, Mr. C. W. Meaden, says that the year 1896 "has been fairly successful, though in all such establishments it must be expected that the success and profit will fluctuate. I enclose a photograph of a group of our milch stock. It is hard to define the origin of them, but they are the product of creole cows by Indian bulls ('Harrina'). These cows give 400 to 500 imperial quarts of milk per month and produce excellent working oxen." We thank Mr. Meaden for the excellent photograph and his satisfactory report, and wish the Trinidad Farm continued success.

TEA COMPANIES AS AN INVESTMENT.

Indian and Ceylon tea companies have lately attracted a great deal of attention, both from the remarkable development which has taken place in the industry during the last few years and also because of the very profitable nature of the enterprise. With a view to obtaining reliable data to guide intending investors in this class of shares, we have collected statistics of the result of last year's working from the balance-sheets of those companies which are open to the public, and which have already published their accounts for 1896.

There are several points of great interest in the history of the tea-growing industry of India and Ceylon, whether we regard it from a financial or from a political or social point of view. These latter have their bearing on the aspect of the subject with which we are more particularly concerned—that of the investors'—and therefore, they may with advantage be briefly reviewed. In the first place that the industry is situated within the British Empire is an advantage upon which it is not necessary to dilate. The remarkable fact is that this tea industry of India and Ceylon is a comparatively new one, at least in its present dimensions, China having been in the past the great tea-producing country. Now, however, the teas of India and Ceylon have completely ousted China teas from our home markets.

Another feature for consideration in judging of the merits of the tea companies as an investment is the marvellous development which has taken place in the consumption of tea in the United Kingdom. The following figures, for the alternate years from 1891-5, taken from the last Blue Book, will show this in the simplest way possible, and will also indicate to what extent Indian teas have beaten China teas out of the British market.

	1891	1893	1895
India ..	109,637,790	115,022,926	123,361,870
Ceylon ..	61,900,075	72,630,852	83,447,792
	171,537,865	187,653,778	206,809,662
China ..	57,023,986	49,911,926	34,329,421
Total imports	240,779,331	249,546,451	255,360,128

The above observations indicate fairly well the present general position of the Indian and Ceylon tea industry. There are other and very important circumstances affecting the future; these will be considered later on.

We now come to examine the companies individually. The statistics given below, being the figures of the paid-up capital and the net profits for last year, have been collected by us from the accounts of ninety-four companies—all those which have, so far, been published, and of which we could procure a copy. In the majority of cases they cover the twelve months, January-December, 1896, but in many instances the accounts are made up to the end of the half-year, or to one of the quarters. In collating these statistics our chief difficulty has been to make the term "net profits" mean exactly the same thing in all cases. The different methods adopted in making up the accounts explains this difficulty. For instance, some companies deduct income-tax in order to arrive at the net profits; others do not. In the figures given below as net profits, income-tax has *not* been deducted, and where possible we have restored the amount in those cases where it had been charged as if it were an item of management expenses. This restoration has not been possible in every case. There are also variations in respect of allowances for depreciation and extensions of gardens out of revenue. These it has been impossible for us to remedy. We give the figures as accurately as we can; perfect uniformity is impossible.

In order to allow of convenient comparison we have kept the Indian and Ceylon companies distinct, and we have further subdivided them into groups, according to the quality of the tea produced, as shown by the prices realised—viz, high class, medium, and low class. The average price of Indian tea last year was 8·75d. per lb., and of that of Ceylon growth 8·25d per lb. In the case of the former we have taken as the margin for high class tea those which realised over 10·50d. per lb.; as medium, those selling at between 8·75d. and 10·50d.; and as low class those which fell below the average for the year of 8·75d. Ceylon teas do not reach anything like the high-water mark of the best Indian companies, and we have therefore made the single distinction—those ruling over and those ruling under the average of 8·25d. This classing is purely arbitrary. Only companies with paid-up capitals of £40,000 and over have been set out specifically :—

INDIAN.

Compauy.	Paid-up share capital.	Price per lb. 1896.	Net profit, 1896.	Per cent. ordy. shares.
High-class over 10·50d per lb.	£	d.	£	
Assam ..	187,160	12·45	44,632	20
Darjeeling ..	135,420	12·18	9,862	6
Darjeeling Consol	120,000	10 75	5,031	2 1-12
Doom-Dooma ..	157,500	11·75	31,332	12½
Eastern Assam (*a*)	61,120	11·50	3,188	4
Lebong ..	65,656	12·30	12,682	15
Tingri ..	56,500	13·42	4,059	6
Assam Frontier..	285,000	10·77	22,687	6
Jokai ..	300,000	10·79	30,590	10
Nahor Rani ..	40,419	10·50	4,049	10
*Other Cos. (7) Under £40,000 capital ..	178,400	—	16,331	—
	1,587,175		184,443	11·62
Medium class 8·75d—10·50d per lb.				
Attaree Khat ..	66,745	9·25	4,823	8
Borelli ..	78,170	9·12	4,513	5
Chubwa ..	66,000	9·93	7,445	10
Jhanzie ..	83,500	10·33	9,521	10
Majuli ..	95,970	10·31	5,162	5
Mungledye ..	52,320	8·87	660	—
Scot. Assam ..	79,590	9·40	6,761	7
Dejoo ..	43,580	8·99	3,469	8
Rajmai ..	41,000	9·75	3,700	10
Hunwal ..	46,600	9·77	750	2½
Empire India and Ceylon ..	429,380	9·56	30,046	10
Jorehaut ..	100,000	9·64	19,213	20
Singlo ..	180,000	9·13	9,398	5
† Other Cos. (6)	157,000	—	7,988	—
	1,519,855		113,819	
Low class under 8·75d.				
Brahmapootra..	114,500	6·98	27,593	20
British Indian..	77,325	7·19	5,592	5
Cachar and Dooars	153,000	7 00	10,426	7
Dooars ..	225,000	8·26	30,139	12½
East Indian and Ceylon ..	170,000	7·70	12,657	7
Indian Tea Cachar	94,060	7·47	1,589	3
Lankapara ..	50,000	7·50	5,238	10
Lungla ..	200,000	7·59	13,059	6
Chargola ..	153,017	7·23	15,557	10
Borokai ..	43,560	7·69	1,684	4
Meenglass ..	43,000	7·19	2,887	6
Allynugger ..	120,000	6·94	5,531	3
‡ Other Cos. (9)	180,031	—	16,983	—
	1,623,493		148,935	9·17

(*a*) Eastern Assam, capital been reduced by half.

* Baligan, Budla, Beta, Kamroop, Moran, Behubor, Brit, Darjeeling, Suddia Road (7).

† Bargang, Brit, Assam, Chardware, Choonsali, Borjan, Tiphook (6).

‡ Borholla, Derby, Leesh River, Mazdehee, Sylhet, Dekhari, Sephiujuri Bheel, Southern India, Wynaad (9).

CEYLON.

Company.	Paid-up share capital.	Price per lb. 1896.	Net profit, 1896.	Per cent. ordy. shares.
High class over 8·25d.	£	d.	£	
Nuwara ..	158,700	10·30	8,320	6
Ouvah ..	100,000	9·15	5,351	6
Spring Valley ..	80,000	9·08	—	2½
Dimbula ,, ..	150,000	9·22	14,375	10
Ceylon Land ..	47,950	8·25	11,372	20
Carolina ..	60,000	8·35	7,586	11
Imperial Estates ..	90,000	8·36	4,113	5
Scottish Ceylon.	50,000	8·86	8,976	15
Standard ..	56,000	—	11,284	15
Alliance ..	50,000	8·23	5,187	10
Scottish Trust and Loan ..	45,000	9·50	5,539	12½
* Other Cos. (2)	46,000	—	3,702	—
	933,650		85,805	9·10
Low class under 8·25d				
Ceylon and Oriental ..	101,264	8·07	8·316	7
Ceylon Plantations ..	248,460	8·14	50,596	15
Consol. Estates.	62,000	6·50	6,866	8
Eastern Produce ..	299,888	7·33	39,163	6½
Lanka Plantations ..	164,700	8·15	10,708	5
Sunnygama ...	55,000	6·75	6,213	8
† Other Cos (11)	228,363	—	23,296	—
	1,159,675		145,158	12·5
Not classified—				
New Dimbula ..	86,200	—	20,323	14
United Planters	139,400	—	10,268	6
Madulseema ..	96,700	—	2,033	—
Haputale ..	66,547	—	4,040	—
‡ Other Co.s (3)	48,940	—	4,602	—
	437,787	—	41,266	
				Per cent.
Total Indian..	4,730,523	—	447,197	9·45
,, Ceylon..	2,531,112	—	272,229	10·75
Grand Total..	7,261,635	—	719,426	9·90

The striking feature in the above figures is the remarkable and uniform success of the companies, the normal dividends on the ordinary shares being from 6 to 15 per cent, whilst the average is 10 per cent. The 94 companies represented above have an aggregate paid-up share capital of £7,261,635, and the net profit on last year's working was £719,426, equal to an average return of 9·90 per cent. The Indian companies, representing an aggregate capital of £4,730,523, last year made a net profit of £447,197, or 9.45 per cent. The Ceylon companies, representing £2,531,112 capital, gave a return of £272,229, or 10·75 per cent, or 1¼ per cent more than the return on the higher priced Indian teas.

The classification according to the price of the teas produced on the various gardens gives some remarkable results. The Indian companies which produce the best class of teas have obtained a profit on an average of 11·62 per cent, and the cheaper teas gave a return of 9·17 per cent, the better class of tea yielding 2½ per cent more than the inferior quality. In the case of Ceylon, however, the reverse holds good. The companies which have produced tea below the average of 8·25d per lb. have given a much better result for the investor than the better class, the percentages being 12·5 for the former and only 9·1 for the latter.

What of tea-growing as an investment? The statistics given above point to it as being a very remunerative undertaking. Tea-growing, we believe, is a sound industrial enterprise, and although there are influences, both advantageous and disadvantageous, which will greatly affect the future of the industry and which need to be very carefully considered, under present circumstances we think the debenture stock and the preference shares afford opportunities for safe investment. An average return of 10 per cent on a total capital of 7¼ millions is sufficient evidence of the satisfactory security which the preference shares, at least, offer as an investment. A considerable proportion of this 7¼ million being preference share capital, the dividend upon which is fixed, the amount required for that dividend would be much less than 10 per cent, leaving a larger amount than a ten per centage for the ordinary share capital, which surplus constitutes, in effect, an annual reserve for the preference shares. In other words, the security for the preference shares in the aggregate in the above companies is very much more than the 10 per cent which the net profits seem at first sight to indicate. The ordinary shares are, of course, more liable to fluctuations. Their value as permanent investments will be inquired into in a subsequent article.—*Investors' Guardian*, London, July 10.

* Battalgalla, Ragalla (2).
† Bandarapolla, Central Ceylon, Ederapolla, Highland, Hunasgeria, Kelani, Rangalla, Tyspane, Goomera, Nehalma, Panawal (11).
‡ Caledonian Plantations, Poonagalla, New Ceylon Plantations (3).

DUMONT COFFEE CO., LD.

The report of the directors of the Dumont Coffee Company, Limited, states that the profits for 1896 were guaranteed by the vendors at £120,000 which sum was duly paid to the company. After meeting expenses and writing off the entire preliminary charges, paying the debenture interest and preference dividend, and also a distribution of 10 per cent. on the ordinary stock, a sum of £83,506 is placed to reserve account, and £11,411, carried forward. The actual profits of the Companhia Agricola Fazenda Dumont for 1896, after providing for all outstandings on the estates, amounted to R2,444,024 $694, which sum, calculated at the average rate of exchange, is equivalent to £92,605 sterling. This short fall in the profits is mainly attributable to the heavy drop in the price of Santos coffee, and to want of care and supervision in the harvesting and curing of last year's crop, owing to the ill-health of the vendor's manager. A large difference arises, moreover, in the conversion of the profits into sterling at the average rate of exchange for 1896, as against the rate at which the auditors based their estimates in the prospectus. The crop, which had been calculated at 80,357 cwts. amounted to 74,415 cwts. The directors were not in a position to exercise any control over the management of the property until the 1st January last. Since then steps have been taken to introduce a better system of management, and to add considerably to the machinery and appliances for curing the coffee crop. A considerable quantity of new machinery has been purchased, and some of it is already erected and in working order on the estates.—*Financial Times*, July 9.

Coffee Plant Disease.—A Nilgiri correspondent writes :—"The comparatively dry weather that has prevailed in the southern and eastern parts of the Nilgiris has developed a serious attack of leaf disease on coffee estates and the planters are anxious that some investigation should be made by Government."

Correspondence.

To the Editor.

SALT FOR AGRICULTURAL AND PLANTING PURPOSES.

Franklands, Veyangoda, 13th March, 1895.

The Hon. the Colonial Secretary,

Sir,—1. I beg that you will place before His Excellency the Governor this my application for five tons of salt, to be used in certain agricultural experiments on this estate.

2. The manurial value of salt in agriculture is well-known; but so far as I am aware, the quantities in which it may safely be applied to land, the particular crops to which it is most beneficial, and the duration of the benefits which may follow on an application, have never been ascertained, at any rate locally.

3. A few years ago there was considerable discussion in the local newspapers, on the special value of salt as a manure for coconut estates situated at a distance from the sea-borde where coconuts are known to flourish best, presumably owing to the presence of salt in large quantities in the soil, and to their being under the influence of salt-laden winds. My recollection is that an application was made by the Agricultural Association, which has ceased to exist, for the issue of salt at cost price; but the then Government felt itself unable to accede to the request because of the difficulty of denaturing salt, so that it might be made absolutely unfit for human food.

4. Since then the island, or to be more accurate the districts in which coconuts are most extensively cultivated, have passed through two successive years of drought, which have told disastrously on coconut estates and coconut crops; and it has occurred to me that experiments might establish, that the use of salt as a manure might minimize the evil effects of droughts, by rendering the soil more retentive of moisture—the hygroscopic properties of salt being well-known. It is the desire to carry out these experiments, not wholly from disinterested motives, which impels me to make the present application; but I do not ask for a free issue of the salt, though if it were offered I should not decline it, as I shall have to incur some expense in connection with the experiments. I am prepared to pay the cost price of the salt, or the price at which it is sold for exportation.

5. The application that salt should be issued for a local experiment, which may be fraught with immense benefits to a national industry, at the same price at which it is issued to strangers to be carried away from the island, cannot be justly regarded as unreasonable; but it may be as well to anticipate two possible objections.

(a). If it be asked what guarantee is there that the salt thus issued or a portion of it, may not be used for food, to the detriment of the revenue, my only reply can be a personal undertaking that the salt shall be kept under lock and key, and applied under my personal supervision, mixed with cattle manure, or some compost, and so dug in, as to be practically inaccessible for food.

(b). To the objection that assuming the experiments to be successful it would be impossible so to denature salt, issued for agricultural purposes as to render it unfit for food, I answer that it may be so. I am not aware that experiments have established that salt can, by mixture with other ingredients, chemical or offensive, be rendered absolutely unfit for food; but it would be wiser to deal with probabilities than mere possibilities in the practical issues of life. Every planter knows the difficulty there is in getting coolies to handle, or even to mamoty, manures offensive to the smell and suspected to be mixed with excrementious matter. Is it then in the least degree probable that even the most needy or foul-feeding cooly will wash small crystals of salt clean, in order to use it for food? Assuming that a certain proportion of labourers may do so, to what extent will the revenue be dammified by their erratic and exceptional proceedings? Probably not to the extent of R10 a year.

6. It seems to me therefore, quite practicable to issue salt of a quality unfit for human food, or so treated as to render its use for food practically impossible, and under guarantees from the purchasers which shall protect the revenue; but assuming that these safeguards may fail, it would be absurd to assume that it will fail in every case, and that every purchaser of salt for agricultural purposes will risk criminal consequences by turning retailer of salt. The loss to the revenue, if any, is likely to be trifling, and caused chiefly by peculation. But as against that must be placed the immense benefit it would be to the whole country, if its productiveness can be increased even by one-twentieth, by the use of salt as a manure, and if its herds can be protected against sickness by the free exhibition of salt.

7 If it once be established that salt can be applied with appreciable benefit to the land, the Government may find it possible to sell salt, without any restriction as to its uses, at a reduction in price, which, through the increased consumption, will ensure the same direct revenue, while indirectly the revenue will be greatly benefited by the greater productiveness of the soil, by the improved health of the people as a result both of more abundant food and cheaper salt, and by the greater immunity of cattle from sickness.

8. I have said thus much to show that my experiments if they establish that salt would be decidedly helpful to coconut cultivation, will be very beneficial to the country at large and will not imperil the revenue. I beg that His Excellency may be pleased to give my application favourable consideration. If necessary, the experiments may be carried on under the direction, or on the advice, of the Superintendent of the School of Agriculture, so that results might be carefully noted.—I have the honour to be, sir, your obedient servant, FRANCIS BEVEN.

Colonial Secretary's Office,
Colombo, 5th April 1895.

Francis Beven, Esq.

Sir,—I am directed to acknowledge the receipt of your letter of the 12th ultimo, applying for 5 tons of salt, to be used in experiments to test its value as manure, and to inform you that the matter was duly laid before the Governor.

2. In reply, His Excellency desires me to say that personally he would have no hesitation in trusting you to carry out your experiments; but that, if salt were so issued on a large scale to as many persons as desire to try it, the privilege would be abused to the detriment of the revenue. The Government would, therefore, in granting your request, be exposed to a charge of favour-

itism, inasmuch as the desire to safeguard the public interests would certainly dispose the Government to refuse similar applications from many others

3. As regards paragraph 5 of your letter, I would refer you to the *Government Gazette* of May 1st, 1869, and would further point out that a cooly who had cleansed salt of its impurities and rendered it marketable, would not probably consume it himself, but would sell or exchange it in the bazaar.

4. It may be mentioned that in 1887, a similar application from a well-known member of the Mercantile Community in Colombo was refused on the same grounds.

5. His Excellency regrets therefore that the Government is not in a position to meet your wishes.—I am, sir, your obedient servant,

H. L. CRAWFORD, for Colonial Secretary.

COCONUTS AND SALT.

Veyangoda, July 15.

DEAR SIR,—I was much interested in Mr. Cochran's report on his analysis of coconut husk, (see page 173). The manurial value of the husk is well-known; and even villagers bury or dig in the husk round coconut trees. As a rule, however, they prefer to spread it on the surface round a tree, but more frequently they let heaps of husk rot *in situ*. This neglect of a valuable manure is not always due to ignorance of the fact that it is a manure. Heaps of cattle manure, whose virtues the most ignorant will not deny, may be seen similarly left unapplied. The neglect is generally due to two reasons—1st, idleness, or unwillingness to trouble oneself to transport and dig in the valuable stuff which is all there, and with which no one will run away! And second the superstition that manures are ultimately hurtful to a tree—that if once applied, its discontinuance will be injurious if not fatal to the tree; but I have never been able to get an answer to the question, why one should discontinue the use of a thing proved to be profitable. Any way, even the occasional and infrequent application of the husk, in however primitive a fashion, is evidence that it is recognised as a manure; and I presume, the soil derives the benefit of the same constituents from the husk, whether buried or reduced to ashes—only in the former case the absorption of the manure is much slower. Mr. Cochran's interesting and practical investigations are of special value, because they furnish accurate information on the constituents of the husk ash; for though he deals tenderly with the analysis which Messrs. Davidson and Lepine have published, the great difference between his and their figures cannot be entirely explained away in the manner he suggests. But even his more modest figures prove that a ton of the crude ash is worth R80, and that the husk of 65,000 nuts would produce that quantity, giving about R1·24 as the value of 1,000 husks for their potash and phosphoric acid alone? I was at first under the impression that it was a ton of potash which was valued at R80. That would have reduced the value of the husks to about one-third the price stated; but on re-reading Mr. Cochran's calculations, I see I am mistaken. On his showing, proprietors part with husks at much below their manurial value in selling them to fibre mills, but the question remains, will the mills be able to afford to buy them at more than their value as a manure? The coir fibre and bristle trade is believed to be overdone, and the margin of profit is said to be very small. What would the effect of a rise in the price of the raw material be? Then, I suppose, analysis of the soil alone can determine whether it needs all the constituents which the husks taken from it yields, and whether its needs may not be more efficiently and economically supplied in other ways. Then again, there is the further question—how much of the manurial constituents is taken away by manufacture, and how much remains in the refuse coir dust? The dust is known to be an excellent deodorizer, and its efficacy as a defensive armour for ships between plates or planks has been asserted. If its ashes contain an appreciable proportion of the constituents which the husk has been credited with by analysis—then estates may take back the dust after selling the husk! and, who knows how much more that is valuable in coconuts and is now allowed to run to waste, may be rescued by science for the benefit of proprietor and manufacturer?

Though I have not systematically reduced husks to ashes, I have used them largely to pack trenches and to fill up depressions with good results; while I have sold husks to Fibre Mills only when carriage was practically free. That is whenever I send my carts for roadside cattle manure, I send them laden with husks if available. Otherwise husks are retained for application to trees. After Mr. Cochran's letter, it is a question to be considered whether I gain any advantage, and how much, by exchanging a cart of husks for a cart of cattle manure. Curiously, only last week when I had the pleasure of taking the Director of Public Instruction over this place, we discussed the uses of husk, and I mentioned to him its richness in potash, and made special reference to the sharp taste of the ash and its resemblance to saltpetre. I had no analysis in view then, but as Mr. Cochran states that no wood ashes he has ever analysed had more potash than the ash of coconut husks, I would ask him whether he has ever analysed the lantana bush? I have a recollection that Mr. Dixon, the first Science Master of the Royal College, found lantana the richest of all vegetable substances in potash, but Mr. Cull was unable to confirm my impression.

Then, there remains the question of salt. Its presence in such large quantities in the ash—two-fifths of the weight—is additional reason for the use of husk as manure, especially in inland districts; but I must reserve what I have to say on salt for another occasion.

Faithfully Yours,

F. B.

"ASH OF COCONUT HUSK"; AND VALUE OF SALT AS A MANURE.

Colombo, July 17.

SIR,—Referring to your correspondent's remarks as follows—"I would meanwhile point out that Mr. Cochran's calculations are rather out. Has he not taken the weight of ash in working out the value of the potash?"—I would reply yes, certainly; but not in such a manner as to "enhance the value of the husk 3-fold." The value put on the crude ash is simply the value due to its contents of potash and phosphoric acid, so that there is no mistake.

The question as to the value of common salt as a manure has always been a disputed one;

men like Liebig, Lawes, Warrington, and Voelcker declaring against it; although Dr. Voelcker (according to Dr. Griffiths) latterly recognized its value as a manure which increased the yield of wheat, barley and oat crops. There is no doubt that in special cases salt is of use as a manure. Thus Dr. A. B. Griffiths states that from his own experiments and experience, a dressing of 1½ cwt. nitrate of soda, and 1½ cwt. salt per acre, forms an excellent manure for mangold-wurzel. From the evidence before us, I am disposed to consider the coconut tree as one of the special cases in which salt is useful as a manure.

Dr. Griffiths sums up the general properties of common salt from an agricultural point of view as follows:—

(*a*) The property of salt, *in small* quantities, in promoting the decomposition of the animal and vegetable matters contained in all cultivated soils is considerable

(*b*) It acts as a *direct plant food* in small proportions.

(*c*) It has the power of destroying noxious insects, slugs and weeds, when applied to fallows.

(*d*) Salt possesses stimulating powers on growing plants.

(*e*) It has the power of preserving the juices of plants, and the soils in which they grow from the effects of sudden transitions in the temperature of the atmosphere (C. N. Johnson, F.R.S.)

(*f*) "It increases the power of certain soils of absorbing moisture from the atmosphere."

I may mention, in conclusion that, according to the same author, salt has been used as a manure in Palastine and in China for more than 2,000 years. M. COCHRAN.

SALT AS A MANURE.

July 26.

Dear Sir,—The discussion on the use of salt as a manure is one deserving of consideration. I have noticed that seaweeds are largely used in England as a manure, and consequently trees and plants which grow near the coast in the island may improve by the addition of salt to the soil. It has been proposed from time to time to reduce the Government price of salt for agricultural purposes, and to so adulterate it as to render it unfit for human food. According to a reasonable way of putting the matter it is anything but just and equitable to raise the price of salt for the food of man and to reduce it for the food of plants. What would be said if the Customs charged a higher duty for paddy imported and used as food for human beings, and lessened the duty when imported to feed dumb animals. Such a proceeding would not for a moment be countenanced by Government.

As far as I know the quantity of salt for a coconut tree need not be very much, one seer or measure, or a little more, would be sufficient for each tree. A bushel contains thirty-two seers, I think, and this may suffice for thirty-three young coconut trees, but older trees may require a little more. If one-third of the price of a bushel of salt be reduced it would answer both for agricultural purposes and as a necessary of life. Of all the taxes on food the most unjust one is a *salt tax*.

The salt which is annually destroyed may be collected and used. Those who have noticed the manufacture of salt, and also the natural crystalization of it in salt pans, or little lakes called leways, would have observed that if soon after the crystalization of salt it is not collected, long crystals shoot between the square crystals of common salt and render the salt bitter and unfit for human food. The long crystals are those, I think, of glauber salt, or sulphate of soda. Salt of this kind may well be collected and sold cheap for agriculture. The mixed salt is too bitter for food and not easily removed from common salt; and the cost of doing so would be expensive and not worth the trouble if salt for food is made cheaper. This would at once remove the difficulty of adulterating salt so that it may not be used as food.

One time salt was sold cheap, or in reduced price, for fish curing yards; but there have been such restrictions that the fishers gave up curing fish in the yards or huts kept by Government for the purpose. It is a pity that more encouragement was not given to this industry, as it is believed that badly cured fish as a diet, is very unwholesome and apt to produce disease. —Yours truly, X.

[We quite agree that it will be a happy day for the mass of the people when the salt tax can be reduced or abolished; although it is questionable if people in remote districts could even then get salt cheaper than it is now given by Government. But the principle on which salt is wanted free for agriculture is that it may increase the production of food staples.—Ed. *T.A.*]

SALT IN AGRICULTURE.

Dear Sir,—It is a matter of great satisfaction to me to find that the agitation I started about ten years ago for the use of salt in agriculture in general and in coconut cultivation in particular, receives support now from you after the analysis of Mr. Cochran revealed the fact that salt in large quantities is to be found in the products of the tree. I received no support from you at that time as you shielded yourself behind the analysis of Lepine and the opinion of Dr. Trimen that the small quantities of salt vegetation required was supplied by the storms of the S.-W. monsoon.* The aspect of affairs has changed now that Mr. Cochran has proved the unreliability of Lepine's analysis as regards husks. What about the other parts of the tree? Will not the moribund National Association do a "national" duty by a product of "national" importance and have complete analysis made of all the products of the coconut tree after the manner of Lepine's tables.† My agitation of 10 years ago started in this wise, coconut leaf disease was receiving attention. It was found chiefly in inland districts‡ where coconuts were not growing under natural conditions as regards situation and soil. I suggested that possibly the cause of the disease was due to this and that it would be wise to restore natural conditions as much as lies in our power by systematic application of salt to the coconut tree.

* We cannot understand to what our correspondent refers. In the very first edition of our illustrated Handbook "Ceylon in 1883" and in every edition since, we have placed the releasing of salt from tax for agricultural purposes, as one of the reforms of the future to be kept steadily in view. "B." must be referring to some remark of our "senior" during our absence from Ceylon? But on the general question of free salt for agricultural use, we know he also wrote favourably so far back as the "sixties."—Ed. *T.A.*

† How is a "moribund" institution that has not paid its debts, to do this?—Ed. *T.A.*

‡ It was very bad in Slave Island near Galle Face. —Ed. *T.A.*

If I mistake not Mr. Francis Beven then, for the first time, applied to Government for salt to be issued to him for experimental purposes at wholesale price. In reply he was asked for figures of the probable consumption of salt for agricultural purposes if issued at reduced rates. Of course he could not answer so unreasonable a question unless all agriculturists became specially communicative and confided their probable requirements to him. Then the matter dropped.

The reply to Mr. Francis Beven's reasonable and modest request of 1895 does not redound to the credit of Government as far-seeing, paternal or practical. The objections put forward are fanciful. No cooly will purify contaminated salt to sell it. He will hardly find a purchaser for it when it will be known far and wide that contaminated salt is being used on the estate he hails from.

I attempted to revive the agitation for the use of salt in coconut cultivation so lately as last year and quoted numerous authorities in support of its use in agriculture. My communication was published in the *Observer* without one single word of comment,* and it led to no correspondence. I gave the matter up in disgust as no one danced to my piping.

Now as to the method and time for application. Salt being so soluble it will not be advisable to apply it even in heavy soils except as a top-dressing and with the last rains of the S.-W. monsoon. Owing to its power of attracting moisture from the atmosphere, it will be helpful towards enabling the trees to pass through the trying period of drought. For districts suffering from drought and where it becomes necessary to water not only coconut plants but trees as well, its use cannot but be of the utmost use. My guiding principle in cultivating a coconut estate is to let no product leave it but what is essentially necessary for financial purposes and to get into it for application to the soil all I can. I for a time successfully resisted the wish of a former employer to sell his husks to fibre mills. He said I could get a return load of fibre dust. I was for getting the dust in addition to keeping the husks. His wishes or orders as supreme prevailed in the end. I feel sure after Mr. Cochran's analysis of the husk he must feel sorry that he allowed so much valuable manurial matter to be removed from his estate and for only a small consideration. I think Mr. Cochran's calculations should not be the means of inducing intelligent planters to sell their husks if they get an offer for them above what they are worth as a manure. All waste products should be returned to the soil, after burning, as a rule, for substances that decay slowly. Of course, there is a loss of organic matter by this, but that is compensated for by the quickness of the results.

The richness of husks and branches in potash is well known to Ceylon dhobies though they are not chemists and they take practical advantage of their knowledge to the destruction of our clothes. In the Western Province the ashes of husks is used in the place of soap to wash clothes, and in the Southern Province that of the branches, or rather petioles. After rain had fallen on burning branches I have picked up crude potash in white crystals very sharp and corrosive to taste and touch. B.

[The agitation to enable Ceylon salt to be used for agricultural purposes, began first in 1866, within our time, and has been renewed at intervals since.—ED. *T.A.*]

* In our absence again unfortunately!—ED. *T.A.*

THE CACAO DISEASE.

Suduganga, Matale, 10th July, 1897.

DEAR SIR,—In solicitation of practical experience in the matter, and under this to elicit as far as possible what may be the cause of the disease which attends the Common Red variety of Cacao at a certain age, would you kindly publish the enclosed Correspondence.—I am, dear sir, yours faithfully,

GEORGE A. GREIG.

Mr. G. A. Greig's letter to Mr. Green.

Suduganga, Matale, June 28th 1897.

E. E. Green Esq., Punduluoya. Dear Sir,—I was very glad to see from your letter of the 21st in the *Observer* of the 23rd you were of opinion that the present causes of the disease affecting our cacao *were not directly traceable to any insect.*

I have a theory on foot that the *spread* of "canker" has been entirely due to having cut off suckers, which I base on the following points—1st, I notice in cases where old trees have been allowed to grow with very little suckering or none at all, these remain (so far) healthy and are for the most part not subject to disease;

2nd. That canker predominates in the better cacao where soil is richer; and 3rd, that the poorer cacao besides being unaffected looks better than it ever did.

Taking the 2nd and 3rd points into question I can only arrive at a reason for the diversities in these, in the following:—That cocoa in the richer soil having borne abundant crops, and the *limbs* in consequence (being unable to extend or renew themselves in time owing to suckering) were in a weak state, and diseased (and thereby subject to the attacks of insects and fungi) resulting in mortality. That the poorer cacao not having cropped to the extent of the other, though subject to the same treatment in every way, the limbs were in healthier condition enabling the trees to withstand the attacks of insects and fungi as well as respond to last year's *favourable* weather.

I agree with you that the branches of a *cankered* tree, as a rule, are not affected, and this goes to prove, I would think, there is no infection in the disease.

It is well known, or it may not be, that branches renew themselves, and are auxiliaries to one another in different periods of fruiting, and cacao being a stem-bearing tree, so also, I maintain should stems have the same advantage in not being suckered at all at any time to either elongate themselves or that the tree have two or three limbs from the bottom as nature may provide. In having an increased number of stems or *limbs* (the latter term properly speaking, and I borrow this vantage after reading your letter of the 21st), this would mean a further development of primaries (?) secondaries, &c., and equalize the fruit bearing area, and possibly prevent trees over-bearing. And it is to over-bearing on the one limb I attribute weakness. I notice that if a tree does not give much crop in the autumn it generally responds in the spring and *vice-versa*. In the same manner this may account for extra cropping every alternate year.

Of course the question now is in the present causes of disease in old cacao,—What is the best course to pursue for a cure?

In the theory I put forward the only answer is let all suckers grow. But (that inevitable!) in cases where the trees have been subject to a severe treatment of suckering it will take at least two years or perhaps longer to prove the remedy. And this inasmuch as suckers will require the time to mature and *assert* themselves from the roots, and no tree will be safe till it has a *limb* auxiliary either in extended form or in two or more stems. Likewise suckers will die with the old stem or limb if their growth is not well advanced.

I know of cacao trees (Common Red variety) which have been allowed to run up and to all appear-

ance have not been suckered, and (these for my "idea") I would not wish to see better.

I should be much obliged if you would kindly let me have your opinion on my views. And you can make what use you like of this letter if it will be of assistance.--Yours, &c.,

(Signed) GEORGE A. GREIG.

(Mr. Green's letter in reply.)

Eton, Pundaluoya, July 2nd.

GEORGE A. GREIG Esq., Suduganga, Matale.

DEAR SIR,—Please excuse delay in replying to yours of 28th ult., but I have been very busy the last few days, and could not find time to give your letter the attention it deserved.

I will commence by repeating part of a circular which, in conjunction with Mr. Willis, I have drawn up for distribution through the cacao districts. It runs as follows:—"From personal examination (on the spot) of a large number of diseased trees, we are led to the conclusion that the canker is the outcome of some obscure constitutional disease or weakness, the cause of which is still undetermined (whether due to fungus, to over-cutting, insufficient shade, or old age); but that it cannot be directly attributed to the work of any insect. The diseased patches on the bark were frequently found to originate quite independently of any insect attack; though any wounds, unclosed knot holes, or insect borings were found to aggravate the disease by permitting the water to enter and permeate the inner layers of bark. On the older and weakened trees, a very large number of the cankered patches were distinctly traceable to open knot holes where suckers or branches *had been torn off*—affording lodgment for water and small insects. On young and vigorous trees all such wounds were repaired by a renewal of the bark. We should be glad to know how far these observations agree with your own."

Now returning to your letter,—briefly stated, your theory seems to be that *canker is mainly due to the practice of suckering the trees*. And you base your argument on the supposition that *cacao trees in good soil are weakened by over-bearing, and are not allowed to recoup themselves by the free growth of fresh wood.*

I think there is a great deal to be said for your theory — and on more extended grounds even than you give. As you will note by my earlier quotation I am of opinion that the disease is the outcome of weakness, and though I was not in a position to make the assertion, I personally suspected the weakness to be largely due to over-cropping which sapped the vitality of the tree and besides predisposing it to disease, prevented the healthy repair of wounds.

It is a very general rule, which is being constantly corroborated, that the more vigorous the growth of a plant, the less liable it is to attack from insects or other pests. It is when the flow of the sap is retarded or its nature altered by weakness or other causes, that the plant falls an easy prey to blights of all kinds. It is evident therefore that a system of reducing or concentrating the cropping area, which necessarily exhausts the plant, would predispose it to the disease.

Not being myself a cacao planter, I am not able to speak with any authority upon the actual methods of cultivation of that particular product; but from an outside point of view and from observations made during the examinations of this disease, I should think it would be more profitable to encourage the growth of several stems or limbs than to confine the tree to one main stem. I noticed during my recent visit to Matale that though these old stems continued to produce flowers, very little of this blossom actually produced fruit in such situation, the bulk of the crop being borne on the more vigorous limbs and branches. My investigations also plainly showed that the canker was practically confined to the old weakened stem. Young trees and the more vigorous-growing Forestero variety were almost entirely free from the disease. Have you ever tried stumping the young plant to induce it to start several stems from the base? With regard to your suggestion to entirely stop the practice of "suckering," I should think there must be a limit to the number that could be left with advantage, but you on the spot must be in a better position to decide that question. But wherever suckers have to be removed, the work should certainly be done carefully and the wound stopped with some water-proof mixture.

Although with careful treatment, such as you suggest it may be possible to keep the red cacao free from canker, still there seems to be no doubt that the Forestero is a much hardier plant and more capable of resisting disease of all kinds. Attention cannot be too strongly drawn to the advisability of selecting hardy disease-resisting varieties in any cultivation. It is a most fortunate circumstance that there are such disease-resisting stocks in so many cultivated plants. In the low-country of Ceylon the immunity of the Assam indigenous tea from Helopeltis is most marked and convincing. Particular varieties of potatoe were long ago found to be more or less proof against the potatoe disease; and rust-resisting varieties of wheat have been most successfully cultivated in Europe. In the case of Phylloxera the scourge of the continental vineyards, particular stock was found that resisted this insect pest, and though the fruit of this variety was not so profitable as that of the more delicate vines the difficulty was overcome by grafting the more valuable variety on to the hardier stock. This last hint might perhaps prove valuable to cacao planters. It would be interesting to try the effect of grafting the more delicate Red cacao to a hardier Forestero stock.—Yours &c. (Signed)

E. ERNEST GREEN.

CACAO DISEASE.

Crystal Hill, July 21st.

SIR,—Mr. G. A. Greig of Suduganga, Matale, whose correspondence with Mr. E. E. Green, on the cacao disease now prevailing appeared in your paper, will be surprised to hear that his next door neighbour so long ago as the year 1890, discovered that it was a mistake to remove the suckers and gormandizers from the cacao tree as it not only tended to weaken the tree by depriving it of its "breathing lungs;" but also helped the old wood to harbour insects which eventually destroyed the trees. But the then proprietor of this property, the late Mr. A. G. K. Borron, like many other old planters, did not believe in it. Two years after, great mortality ensued among the cacao in the district, and it was attributed to a deficiency in the rainfall and want of more shade to the trees. Everyone then resorted to planting dadap trees as shade. The year following was no better both with regard to the rainfall and the disease; but just then this property became my own, and enabled me to put my theory into practice at once. The result may now be seen by any one who wishes to do so, and the visitor will be well repaid for his trouble when seeing that while the mortality is still continuing among my neighbours, I am enjoying a perfect immunity from it.*

Mr. J. H. Barber paid me a friendly visit two years ago, and surprised me not a little when he observed that I was doing just what he had also been doing on his property, "The Grove" Ukuwala, *i. e.* he allowed the cacao tree to grow according to its natural habits. He had been to the West Indies, the home of the cacao plant, and had seen for himself that this was the law there.

It would be presumptuous on my part, though a planter of 20 years' standing, to express any opinion bearing on the scientific notions of Mr. Green; but since that gentleman has had the modesty to acknowledge that he himself was not a cacao planter, I make bold to remark that if by grafting (as he suggests) the delicate Criollo or Caracas over stocks of the hardier Forestero, we succeed in producing a disease-resisting variety of cacao, still I doubt that the pro-

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* We should like to know if Mr. Vanstarrex means that diseased *Red Cacao* trees after allowing suckers to grow, fully recovered?—ED. *T.A.*

duct of the grafted tree would any way be superior to the pure Red Caraccas with which Ceylon always topped the market. Anyone examining the contents of a Forestero pod will perceive that the beans are much flatter than those of the red pod. The latter is the variety that produces the nice and plump bean, and it is this plumpness that gives tone to our produce. Scientific treatment may overcome diseases and pests, but never improve the quality of the product. Our endeavour should therefore, be entirely directed to preserve the purity of our red cacao. This could easily be obtained by allowing the plant to grow in its natural wild state with, of course, the usual help given to nature by the agriculturist. Mr. Green is careful to caution us with regard to the number of suckers allowed to grow; but in my opinion the placing of a limit to the number of suckers grown is likely to do more harm than good. For the fact is that when a superabundance of suckers springs from the tree, only a few takes the lead—following, I suppose, Spencer's theory of the "survival of the fittest"—and the rest linger for a while and die off. And if it is desired to leave only a few suckers to grow and remove the superfluous ones, who is to distinguish the fittest from those which are unfit to survive? There is no room here to even err on the right side; so we better leave it to nature.—I am &c., A. VAN STARREX.

RED (CARACCAS) CACAO RECOVERING ON SUCKERS BEING ALLOWED TO GROW.

Crystal Hill, July 24th 1898.

DEAR SIR,—In reply to your query whether "diseased *Red Cacao* trees, after allowing suckers to grow, fully recovered?"—I assure you that such has actually been the case in my experience where the so-called disease had been only an insect attack. I am unable to say whether the tree had any other disease. Neither could I detect any disease in the Red Cacao trees that are dying on some estates in my neighbourhood other than insect attacks. These insects are in various formsas weevils, caterpillars, wire worms, grubs *et-cetera* which infest the old wood. The infected wood decays gradually when white ants or termites begin to invade it, and finish the work of destruction which the weevils and company had begun. It is remarkable that the insects do not attack new wood. To my mind it seems the attack begins just as the bark attains a certain degree of maturity; but its baneful influence does not manifest itself until it is too late for curative remedies to be of any good. Hence it should be understood that a tree incurably attacked, the suckers—if any could be got to grow on such a tree—would be of no avail. But if that tree had had its sucker growing from an earlier stage of the attack, it is the infested wood that would have gone off and left the sucker to take its place, which again as time rolls on will be attacked by the insects and die off, leaving its place for another successor. It should also be noted that a sucker growing from the stem nearest the ground strikes root and becomes a new tree. Apart from this suckers growing higher up or over the branches—which in the planting parlance are known as gormandizers—are also not to be despised, for they create new arteries in the stem and roots of the old tree and transform it to a new one. Also observe the attacks of helopeltis, the branch dies backward till a joint is reached, whence a new shoot springs out and fills the place of the decayed portion. The same law of nature obtains in every other case.—I am, &c.

A. VAN STARREX.

"CACAO SPEAKS."

SIR,—I have no disease—canker, etc. I have enemies:—The Helopeltis and the Paddy Fly (sap-suckers from small branches); the Red Borer (pith-eater=bad pruning, over-bearing); since the Red Cotton Beetle which perforates the leaves and unripe seed; the Planters' Indifference (bad plants and badly planted in different soil.)

The Helopeltis and Paddy Fly come in swarms at times and suck my sap from the tender branches at edge of leaves.

A mixture of sulphur ½, fresh dolomite lime 1, powdered wood ash 3—well mixed and thrown over and throughout the tree either after a shower or early in the morning when leaves have dew on them, will keep the Helopeltis, Paddy Fly and Cotton Beetle away and this application will strengthen leaf and small branches.

The Red Borer—you should catch the moths in May and June before they lay their eggs; later on you have to watch the trees and as soon as you find the borer at work supply some coolies with a piece of wire and then push in the hole and kill the borers—let him dip it in margosa oil, stop up the hole if you cannot even reach the insect, the smell and no ventilation or egress to carry out its own excrement will soon kill it.

You make such a cry out against poor Tomicus; he would never come near me if not for your planters: and why:—

1. You get and plant unripe as well as over-ripe seed, sometimes in soil without lime and potash. You should remember I require both lime and potash especially in my infancy, same as a child requires milk.

2. Coolies are not always careful when taking me up with transplanter or with baskets and put me in the hole anyhow to get their day's task completed. In this injured or crippled state, I cannot draw up sufficient nourishment to form a healthy tree without some help from you which, however, you decline to give—though in your walks round, by the colour of my leaves and their blotchy seedy bark stems, you ought to see that I am suffering from certain wants, not diseasse.

3. You are so anxious to secure crops that often when I am still young and afterwards when older you allow me to bear more fruit than I can carry and cannot shake off (spirit willing but flesh weak), when you should relieve me of some of the fruit or give me stimulating food to enable me to ripen that crop without suffering in body, not being able to supply the whole tree and fruit with sap, especially when Helopeltis has injured the leaf and twigs and thus stops their help in taking nourishment from the atmosphere and return same with sap, part of the fruit and branches will die and even stem gets bark-bound.

You at times plant me in a soil totally unsuited for me to live and thrive in, soil too poor, a subsoil of clay or rock exposed to much hot wind at one season then to much cold with gales at another season; while so placed I cannot supply sufficient sap for fruit and body, and stem gets also bark-bound.

When bark-bound the juice with fibre between outer bark and stem turns sour, then decays. Tomicus is a great drunkard and soon smells the decay in the sap and then bores holes in the bark to get to the sour sap; when no more between outer bark and stem, then bores into the wood which by this time also gives out sour sap.

You also allow me to be handled rather roughly. You know I am a delicate plant, yet you allow the coolies to pull off suckers and hack off branches, leaving the rough cut to decay and the insects to follow up the decay, where as you ought to have made a clean cut and covered my wound with a mixture of oil and tar. It is not necessary to stump me to start several stems from the base; it is one of my failings to throw out young shoots continually if all these were allowed to remain, I should very soon be choked wanting more sap, than the roots and leaf and twigs can supply and then decay will also set in; but when one or two suckers only are al-

lowed then these will become very strong—even part of the stem below these suckers gets enlarged; such make a hardy tree and after a time you can cut down the old tree—so lose no crop—but you can saw off the old tree eighteen inches above ground and then allow one or two of the lowest (if two, one on each side) suckers to grow—only always cover the cut on old tree with a waterproof mixture of tar and oil to prevent sap oozing out and insects to come to the sap; after it becomes sour then they would bore into wood, &c. CACAO.

TREE PLANTING AND CACAO.

13th July 1897,

Sir,—"*A revolution in tree planting*" is very interesting reading. It must be very encouraging to old coffee planters to know that the system had been anticipated and practised by them almost from the beginning of the era of coffee cultivation in Ceylon. The system of root pruning and cutting of the plant was known as "stumping" and the plants so treated were known as "stumps." I believe the system originated by the planter making thoughtful provision in his nursery for plants both for the actual planting of his clearing and for supplying. The planting was done during the S. W. monsoon and the supplying during the following N.-E. and S.-W. monsoons. The plants for supplying having been found to have far out-grown the 6 to 9 inches in height, supposed to be the orthodox height, stumping was resorted to save transport, the too great shock to the transplantation of large plants and chiefly to prevent injury to the plant by the tearing up of the tap-root and primary roots. The system was found to answer well and supplying was always done with stumps. They were found to be hardier than plants, and when the usual monsoon rains failed, they stood a better chance of growing than plants.

The same care of and attention to the pruning of roots was not given by the planter as is directed by Mr. Stringfellow. An ordinary cooly was set to the task with a pruning-knife. He held the plant top upwards and first pruned the tap root and then the side roots, cutti g at each stroke as many as would come between his thumb and the knife. We are now advised to hold the plant top-downwards and cut the roots, so that when planted the cut surface will be downwards; for "experience has shown that these roots are generally emitted perpendicularly to the plane or surface of the cut." Whether this was a necessity with a surface feeder like coffee is a question, but with a deep feeder like tea there can be no question that it should be carefully followed.

I wonder whether anybody has tried stumping cacao. It is considered a very delicate plant and a non-disturbance of its roots at planting essential to successful growth. The general belief was that cacao was one of the most difficult plants to raise, but once established that it grew on for ever and was as hardy as a jâk tree, as I once heard it described. With the experience of the Boring Tomicus, all that is changed now and cacao is thought to be hardy only after 20 years' growth.

I have a religious love and regard for everything old and it grieves me to read that the old red variety of cacao is condemned as delicate and its supersession by the Forastero suggested. It cannot be so very delicate after all, for there are trees of great age still existing in Ceylon. There are some very old trees at Mango Lodge, Kandy, facetiously called Graves-end, opposite the Military Hospital. If I mistake not, these trees have been alleged to be the parents of the trees on the Doombera plantations. At the "Dewala," Badulla, there are also some old trees and when Mr. Sproule was residing there, the pods were freely requisitioned by the planters on the surrounding estates. At the Mansion, Grandpass, Mr. De Breard has very old trees growing vigorously, from which old Mr. Chas. de Breard used to manufacture chocolate. Please desist from condemning the old red variety as delicate, if on enquiry these old trees are found flourishing.—Yours truly MARAVILLA.

[The delicacy is associated with unsuitable conditions of soil chiefly; but the great matter now is to try grafting.—Ed. *T.A.*]

COCONUT BEARING—TREES AND NUTS.

Dear Sir,—Your para *re* coconut crops in Rajakadalua does not disclose the *number of trees* from which these 37,000 nuts were plucked.* It is impossible to judge whether the return was satisfactory, good, bad or indifferent, without this very essential item of information.

Is it fair to institute any comparison between Rajakadalua and Kandangomua as to the early bearing capacities of coconut trees? Were the Kandangomua trees that came into bearing so soon, put down by the present proprietor as young plants, or were they trees that had already come into bearing and simply transplanted by him after he bought the property? R.

RED ANTS ON TEA.

Keenagaha Ella, Balangoda, July 25, 1897.

Dear Sir,—One of my fields is very badly infested with large red ants, some of the tea bushes being full of nests. Can you or any of your readers tell me of any remedy that could be applied to drive them away, as they interfere a good deal both in plucking and pruning.—Yours faithfully, H. H. KIRBY.

[There is a great deal of information interesting to planters scattered through the volumes of our *Tropical Agriculturist* about red ants. One planter welcomed red ants as the "tigers of the insect world" ready to devour all other insects, even white ants! Another complained of his young potatoes at 4,000 feet being all eaten up by red ants. A third in 1882, begged in the interests of morality for a remedy, as his coolies were indulging in awful language in consequence of the numerous red ant nests! But the only remedy we find suggested, is the following and that was for "coffee" not "tea": however we quote it.—

A CURE FOR RED ANTS.

Dimbula, 23rd April, 1882.

Dear Sir,—Your correspondent "H. J." will, I think, find fire a very effective remedy. I once used it on an estate in the Badulla district where there was a patch of coffee that coolies avoided as much as possible: some of the trees had so many as three nests in them. As it was important to destroy the nests without arousing the ants, I tied branches of dry mana grass to long poles, and having sprinkled the grass with kerosine (a very small quantity) placed the fire under each nest in succession. A great many of the

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* We fancy the Rajakadalua trees are planted about the usual distance, say 70 to 80 to the acre: the year's crop was 107,000 nuts. We do not know anything of the comparison referred to, and do not in the least desire anything invidious to be fostered. The interest is simply in noting at what age and with what crops, coconut palms come into bearing in different districts.—Ed, *T.A.*

ants were burnt, and those that escaped took care not to come back. Precautions should, of course, be taken against the fire burning anything more than the nests. —Yours faithfully, B.

[This remedy, if adopted, should certainly be tried only in wet weather.—ED. *T.A.*]

RED ANTS ON TEA: A REMEDY. RED ANTS ON CACAO: HOW TO INTRODUCE.

DEAR SIR,—When the coffee trees were infested with Red Ants, I used to apply a few grains of arsenic dropped into their nests from above. In a day or two after getting a dose, they were all dead on the ground and about their nests.

OLD COFFEE PLANTER.

[The above ought to suit Mr. Kirby's case. —How true it is that what is one man's meat (delight) is another man's poison (aversion). A cacao planter in the lowcountry has just been telling us how he welcomes and even introduces red ants to his trees, regarding them —"the tigers of the insect world"—as most useful in clearing away a variety of smaller but more injurious insects. His way of introducing red ants into his fields is ingenious. For a jungle walk he provides himself with a long stick with a piece of meat tied along the end of it: when he wants red ants he thrusts this into a nest, the ants fix in the meat and will not leave it, and finally meat and ants are left on a cacao bush where the insect "tigers" make their future home. Our friend also mentions as a fact within his experience, the great fear of the comparatively big red "tigers" of even one of the small ants so often found in sugar! He has seen a regular "bolt" of the former on one of the latter being dropped in their midst, and he has seen how the little fellow rushes at one of the big ones, fixes immovably on his back and quickly kills him. Can the smaller ants eject a poison with their bite?—ED. *T.A.*]

THE RISK OF INTRODUCING RED ANTS ON PLANTATIONS—OF CACAO ESPECIALLY.

Eton, Pundaluoya, Aug. 5.

DEAR SIR,—With reference to the recent correspondence in your columns upon "Red Ants," I think a note of warning should be given against the too free adoption of the plan recommended by your lowcountry correspondent—who encourages and even introduces red ants on his cacao trees. Although they will undoubtedly destroy many small insects; on the other hand, these socalled "tigers of the insect world" (would not "wolves" be a better simile?) are most distinctly guilty of encouraging the presence of some of our most injurious insect pests. Their relations in connection with "scale-insects" and aphides have often been misunderstood. This same "red ant," was once before largely introduced into the coffee districts by some ingenious individual under the mistaken idea—based upon imperfect observation of its habits—that it would prey upon and finally exterminate the coffee-bug. This was an excellent arrangement for both the ants and the bugs; but the result—from the planter's point of view—was not so satisfactory. Firstly, the coffee was rendered almost unapproachable by the ferocity of these supposed allies; and secondly, the "bug" increased and waxed fat, if possible, faster than before. "Scale-bugs" and aphides are to the ants what herds of milch cows are to us; and, as such, are tended and cultivated most carefully. In return for the plentiful supply of "honeydew" yielded by their "insect cattle," the ants will defend them from their natural enemies. I have often noticed that "scale-bugs" attended by ants appear to be in a much healthier and plumper condition than are those which are left to shift for themselves. Colonies of "scale-bugs" and "mealy-bugs" are often included within the nests of the ants; and when the ants outgrow their quarters and migrate to other parts, they carry with them some of their cattle to form the nucleus of fresh herds. If the ants are to be got rid of, after destroying the nests, search should be made upon the neighbouring branches for any "bugs," and these also destroyed;—otherwise the ants will surely make their way back to the source of attraction.

The fact that the small "sugar-ant" (*Plagiolepis longipes*)—one of the weakest looking of its kind—can attack and overcome the ferocious "red-ant" (*Œcophylla smaragdina*), is a most curious and interesting one,—and rather mysterious too. For the smaller ant is, to all appearance, without any efficient means of offence or defence. Its mandibles are comparatively small and weak, and it is unprovided with a sting. But the fact has been observed more than once. I have been told by one very careful observer, of a regular warfare conducted between the smaller and the larger species, in which the former invariably come off victorious, to the gradual extermination or expulsion of the latter. I have myself seen a large cockroach speedily collapse under the attack of three or four of these weak looking little ants. Possibly these natural enemies might be employed with advantage in ousting the 'red ants' from any particular locality where their presence was inconvenient.—Yours truly, E. E. GREEN.

LACE BARK.

Colombo, July 26.

DEAR SIR,—The June number of the *Indian Agriculturist* has the following reference to the lace-bark tree of Jamaica (*Thymelæaceæ*, to which also belong the Sinhalese Naha and Walla—two indigenous fibre trees):—"The tree producing the well-known lace bark of Jamaica is called in that island by the name of lagetto. The inner bark of this tree (the scientific name of which is *Lagetta lintearia*) consists of numerous concentric layers of fibres which interlace in all directions, and thus present a great degree of resemblance to lace. It is said that Charles II received as a present from the Governor of Jamaica, a cravat, frill, and a pair of ruffles made of this material, and it is to this day used for bonnets, collars, and other articles of apparel by Creole ladies."

I have long been thinking whether the fibre of another tree, belonging to quite a different natural order, viz. Nava (*Sterculia Balanghas*) could not be used in the same way as that of the lace-bark tree. It appears suitable enough for hat-making work, as you will see from the accompanying samples of rough and prepared fibre, and specimens which I have bleached as well as dyed in various colours.—Yours truly, C. DRIEBERG.

[We shall forward the specimens of fibre to London for report: they look very promising and attractive.—ED. *T.A.*]

THE VALUE OF KAJU (CASHEW) NUTS.

Galle, August 2.

SIR,—Kaju nuts being looked upon and classed as fruits of inferiority which grow in jungles, their usefulness and intrinsic worth are lost to the detriment of a good trade. They will contrast favorably with many a fruit tree which adorns gardens and plantations.

If the good uses that are made and can be made of the kaju nuts were more generally known, they would be sure to a rest the attention of enterprising agriculturists. How largely have they already taken the place of almonds in the preparation of cakes and a variety of other confectionery. The partiality in which these nuts were held by some Civil Servants of old, can be imagined by the fact of their having been frequently applied for from England. Mr. Cripps, the Government Agent of the Southern Province, after leaving the service had an agent in Galle, in the person of the late well-known Mr. Adam de Zilva, who at the request of the former sent, I understand, a supply of roasted nuts properly skinned by the monthly mail steamers of the P. & O. Company. The late talented Dr. Sortain of Batticaloa, having doubtless perceived that some medicinal property was to be found in the juice of the fruit, tried some scientific experiment to ascertain its virtue, but with what result I am not aware.

In no other part of the island in which I have been stationed or travelled have I seen kaju trees grow so luxuriantly and to bear so abundantly as in Batticaloa. They appear to grow like mushrooms in some places and within 3 or 3½ years begin to bear. The soil seems peculiarly adapted for its growth.

There are large tracts of land in the vicinity of coconut estates and in other places and Crown lands abandoned as unfertile. All these can profitably be utilised for the cultivation of the kaju plant, if people can only be made to realise the hidden value that is to be found in the produce of this despised plant.

Large quantities of kaju nuts are anually exported to Jaffna and Badulla, while the latter station sends in as large a supply of gallnuts to Batticaloa, for shipment to other districts. The use and value of gallnuts are sufficiently well-known to need any recommendation to encourage their cultivation, but not so with the kaju nut, as far as my observation will warrant me to speak with any degree of assurance. The day, I think, is not far distant when the kaju tree will rise to assert its superiority over many other indigenous plants of our island. TRAVELLER.

CASHEW-NUT TREE—FRUIT, &c.

August 6.

SIR,—Traveller's letter on Cashew nuts (*Anacardium Occidentale*) is interesting. The kernel of the nuts as he says, is used in many ways. Before the nuts are matured the natives pluck and cut and eat the kernel—the nuts are also roasted and the kernel eaten—but kota cashew (the sun dried nuts) are the most appreciated and deservedly so, as they are delicious and used very largely in the manufacture of cakes and numerous other "sweets." They take the place of almonds and by many they are considered superior to almonds, they are more milky and have not the bitter taste of some almonds.

To the European palate too they are very acceptable, some of the old residents appreciate them very much. It is said that in olden times, a Commander of a Portuguese vessel spent the whole proceeds of the sale of his vessel in the purchase of kota cashew nuts and jaggery, of which he was passionately fond! In the Western Province the cashew trees are getting scarce—the old cinnamon gardens used to be full of them, but they are fast dying out as the cinnamon is being cleared. In the interior the trees are felled for fuel. The process adopted is when a tree is cut down to bury all the wood for a short time, then dig it up and char the branches—the charcoal thus obtained is largely used by blacksmiths and is said to be an excellent substitute for imported coals—the fire kindled being hot and uniform. The secret of cooking a juicy beef steak on a gridiron locally is the use of cashew nut coals! C.

TEA PACKING AND BULKING: No. I.

August 5.

SIR,—Many a time and oft have I perused with pleasure the letters of our quondam planting friend John Hamilton, but his latest epistle smacks so much of the Broker, I begin to fear all his old planting instincts have become absorbed or are out of date.

Most Tea Factories worthy of the name employ machine packers nowadays, and with these it is next to impossible to put more tea into a chest than it can comfortably contain.

Final firing is no absolute necessity in a moist climate like this as no matter how airtight our bins may be the teas are apt to lose crispness, during the two or three weeks it usually takes to make up a sufficiently large break to please those London people. Bulking is usually done after, as well as prior to this operation and if done properly there should be no unevenness about it.

That there must be some donkey amongst us however, is evident, or there would never be such a variance as 6 to 8 lb. on the gross weight of a package in any one grade, but why damn the crowd on account of one or two black sheep who could so easily be hung up for public execration by our London friends.—Yours faithfully,

F.

No. II

5th August 1897.

DEAR SIR,—In these days of low prices it will indeed be a serious matter for Ceylon Planters if bulking in London is insisted on by the buyers, and we all owe our thanks to Mr. Hamilton and yourself, for calling attention to the matter.

With reference to his remarks *re* OVERPACKING, it always struck me as a weak point in the advertised recommendations of packing machines that so much MORE TEA could be got into a chest with, than without a packer. And unless a packer was used in the London Warehouse it needs follow that either part of the excess would be left out to swell the "sweepings," or be crushed into the chest by porters' boots, causing complaints of "Dusty and Broken."

As to final firing causing unevenness. If the Tea is slightly rebulked after final firing this need not occur. Mr. H. seems to consider final firing a mistake, but would not tea taste very flat, if nothing more, if sent home without being final fired. That is tea kept for a few weeks in the factory before packing. Packing day by day does not admit of bulking.—Yours faithfully,

BULKING PASSED IN LONDON.

DEAFNESS. An essay describing a really genuine Cure for Deafness. Ringing in Ears, &c., no matter how severe or long-standing, will be sent post free.—Artificial Ear-drums and similar appliances entirely superseded Address THOMAS KEMPE, VICTORIA CHAMBERS, 19, SOUTHAMPTON BUILDINGS, HOLBORN, LONDON.

THE CACAO DISEASE.

July 6.

Dear Sir,—Mr. E. E. Green in his letter (see page 160) states:—"Mr. v-d-Poorten's argument in favour of the "poochic" theory, is merely that the *dead* wood is full of beetles and that they are often attracted in large quantities by light." Not wishing your readers to have the notion that my intellect is below par, I wish to state that in the letter I wrote to Mr. Green, at his request, on the subject, these were only minor observations and I wonder that he failed to see this. The main one I considered to be the following:—"The 1st sign of the presence of the grub is the weeping of the bark which when shaved, presents only a slightly grey coloration which deepens rapidly, becomes of a claret colour and later dries up. When the ring is not complete the tree survives, if complete but sufficiently high to allow for new shoots, they soon appear and form a new tree or rather bush. I think that when the tree is only partially attacked, the flow of sap kills the grub, but however the vitality of the bark within a regular radius of the puncture is destroyed."—Yours faithfully,

A. VANDER POORTEN.

"MANNA" IN AUSTRALIA.

Technological Museum,

Sydney, July 22nd 1897.

Dear Sir,—Seeing your note on "Manna" in the June issue of the *Tropical Agriculturist*, p. 828, I have taken the liberty to enclose herewith a copy of my paper on that substance, read before our Royal Society, and hope it may be of interest to you in your Editorial work of that excellent publication.—Yours faithfully,

RICH. T. BAKER.

[The pamphlet referred to is entitled:—

On the Presence of a True Manna on a "Blue Grass," Andropogon Annulatus, Forsk.

By R. T. Baker, F.L.S., Assistant Curator and Botanist, Technological Museum, and Henry G. Smith, F.C.S., Chemist, Technological Museum. [With Plates XXI-XXII.] Read before the Royal Society of N. S. Wales, December 2nd, 1896.

And the opening paragraph runs:—

The specimens, the subject of this paper, were obtained at Wild's Valley, Torrens Creek, via Townsville, Queensland, by Mr. J. R. Chisholm. They had, previous to our receiving them been determined as *Spumaria alba*, Bull,—a fungus found on grass in this Colony and figured in Cook's Australian Funji, Pl. 35, fig. 356, but as Mr Chisholm was of opinion that they were galls, he asked if we would also examine them for him. Our first examination showed that they were manna and not a fungus, as we found that they consisted of large quantities of crystals, as well as some sugars.

There are some 17 pages of letterpress including "Chemical investigation" besides the two of plates.—Any one interested can have the loan of this pamphlet.—Ed. *T.A.*]

PLANTING IN HAWAIIAN ISLANDS: UNDER A FOREIGN *V.* BRITISH FLAG.

Ewa Mill, Oahu, Hawaiian Islands, May 31, 1897.

Sir,—I am anxious to acquire some information respecting Ceylon and Coffee Planting. If you have any works bearing on this subject, I should be glad if you would send me your book catalogue. There are three of us here, who came with the idea of going into coffee-raising, but we do not like the political insecurity and should prefer to invest our capital under the British flag.—Yours truly,

CHARLES LENNOX.

[This is refreshing, while Ceylon men are going freely into land for planting, in foreign territory; but then the Dutch who rule in Java and Sumatra, may be said to be good as well as near neighbours.—Ed. *T.A.*]

PLANTING NOTES.

Mr. H. L. Templer, who left for Europe recently in the M.M. ss. "Australien," was on his way to Brazil, there to take up the new appointment on the Dumont Company's property which we mentioned some time ago Mr. G. A. Talbot had offered him. He will spend about a month in the old country before going to South America, but will set out from Liverpool for Rio about the end of October, *en route* for the Province of Paulo; and he expects to take up duties about the middle of November.

Ceylon Supply Baskets for Brazil.—Ceylon planters, and Ceylon tea and coffee machinery, are not the only things that other planting countries obtain from this island, for we understand that a well-known Civil Servant has placed a very large order in the hands of a manufacturer for "Supply baskets." They are intended for Brazil, and, as soon as they are ready, will be sent off to their destination. They have been ordered for a coffee estate there, and it is very likely that further orders will follow this shipment.

Orange Cultivation.—We learn that our informant was not quite correct in the information published by us (see page 210) about orange cultivation. The importation consisted of 15 doz. plants which the Manager of the Ceylon Tea Plantations Company ordered from Australia, and we learn that they have now been planted on 30 estates connected with that Company, from Nuwara Eliya to sea level, and it will be interesting to see where they thrive best. They have been planted more for the benefit of the estate superintendents than anything else, although useful information will doubtless be forthcoming as to their growth.

Planting in Paraguay.—The Paraguayans have not found much market for their "Maté" of Paraguay (Ilex paraguayensis), the bush from which the South Americans prepare a kind of tea. The Indians collect and dry their leaves, which are ground in mills, those of Parana and St. Catherine, for example, and the powder is packed for transport. According to Dr. Caminhoa, maté is less exciting than tea or coffee, about as stimulating as green tea, and more diuretic than coffee. Some think that mateine, the active principle of maté tea, is the same alkaloid as caffeine, others that it is different because it acts directly on the muscles, whereas caffeine only acts upon them through the nerve centres. Be that as it may, mateine would appear to increase the vital activity in every way; and it does not cause sleeplessness, even when taken in a large quantity. Tobacco is to be cultivated on a larger scale in Paraguay. Several Cubans who paid a visit to Paraguay at the invitation of the Government, go so far as to say that the soil in some parts is almost identical with that of Cuba, which produces the best growth. About a year ago the Government placed two of these Cubans in charge of a plantation near Villa Rica, paying them salaries, and giving them a half share in the profits, besides providing labourers, on the understanding that Cuban methods of cultivation should be employed, and the same taught to such Paraguayans as were willing to learn. The crop raised on this plantation in 1886, though small, is said to be almost equal to the Vuelta Abajo, one of the most esteemed tobaccos of Cuba.—*H. & C. Mail*, July 30.

INSECT PESTS—AFFECTING PLANTING AND AGRICULTURE GENERALLY IN CEYLON.

"INDIAN MUSEUM NOTES," VOL. IV., No. 2.*

This most useful and interesting serial is still issued periodically from the Museum at Calcutta. The latest part,—Vol. IV., No. 2, contains, amongst other valuable matter, the following articles of more particular interest to agriculturists in Ceylon. The first section describes "an Exhibit Collection of Economic Insects in Indian Museum." This is a very practical method of giving information on the subject of Insect Pests, and one which might well be imitated in Ceylon. An exhibit of this kind would be a valuable addition to the Museum at Peradeniya, where it would be more available to planters than if placed in Colombo. In the Indian Museum,—

"The insect pests are arranged not in any natural order, but in accordance with the plants which they attack: thus the insects that attack tea and coffee are placed together, then those that attack cereals, and so on.

Wherever necessary, the actual exhibits have been supplemented by enlarged illustrative drawings."

Amongst the exhibits are several insects with which we are familiar in Ceylon, viz :—*Clania crameri*, the "faggot worm"—common on tea : *Zeuzera coffeæ*, the coffee borer : and many other old foes. The third part of the report consists of "Notes on Insect Pests," by Edward Barlow. These also are divided into sections according to the plants affected. Amongst the Tea Pests the first place is given to a description of the moth *Thosea recta*, the caterpillar of which is frequently reported as doing considerable damage to tea in Ceylon by defoliating the trees.

As this pest is an important one the description may be quoted in full :

"On the 6th May 1895, Mr. E.E Green of Punduloya Ceylon, forwarded to the Indian Museum specimens of the moth and cocoon of the species *Thosea recta*, Hampsn., also specimens of a Hymen-opterous insect belonging to the family Ichneumonidæ, said to be parasitic on the caterpillars of the moth, with the information that the caterpillars had proved a serious pest to tea plants in Ceylon. He wrote :—"Mr. W. Holland, of Balangoda, tells me that it has completely defoliated the trees over several acres of tea on his estate, and that the ground is quite black with their droppings. Fortunately a species of *Tachina* preys freely upon them, and eventually reduces their numbers. Mr. Willisford, of Blackwater Estate, sent me specimens, and stated that they had stripped the bushes of everything but the youngest shoots over a field of 50 acres."

The following particulars are taken from a notice furnished by Mr. E. E Green :—Larva : Colour bright yellowish green with a quadrate saddle-shaped spot occurring on the middle of the bag ; a chain of smaller red spots on the median line in front, and two or three similar spots behind. Oval ; convex above, a marginal and two dorsal series of conical spinous tubercles. Cocoon, compact, oval, dull green, fixed to tea leaves or stem."

[Not a *Tachina*, but a species of Ichneumonid fly.]

I may here take the opportunity of pointing out two rather prominent misprints (or clerical errors on my part). In the description of the larva the large quadrate spot is on the middle of the *back*—not *bag* as printed. And the cocoon of the insect is dull *brown*, not *green* as stated. In quoting my remarks the author has appended a footnote contradicting my statement that a species of *Tachina* (a 2-winged fly) preys freely upon and reduces the numbers of the caterpillars. I can only repeat the statement here. The *Tachina* was by far the most prominent of the several insects that attacked the pest. Mr. Barlow was apparently misled by the fact that I at the same time sent him an Ichneumonid fly which also preys upon the insect. The best method of dealing with this pest is to collect and destroy the cocoons, before the emergence of the moths, thus preventing a second and increased brood. The compact oval cocoons will generally be found clustered upon the branches and twigs of the plant. The caterpillars may also be collected ; but as they are plentifully arrived with urticating spines, this would not prove a pleasant task. If the field attacked should happen to be ready for pruning, the tea might be cut down and the prunings burnt.

The next insect noticed also hails from Ceylon and caused some anxiety at the time of its first appearance. I have not, however, received any recent reports of damage from this pest. It is a small boring beetle (closely allied to the supposed; cause of the present cacao disease) that riddles the stems and branches of tea plants. This account, and the author's remarks, may also be of interest.

"2 :—XYLEBORUS FORNICATUS, EICHHOFF.
(Ord. Coleoptera, Fam. Scolytidæ.)

Plate V, fig. 2—a, larva; b, pupa; c, d, imagos ♂ and ♀ e, affected tea stem.

Xyleborus fornicatus, Eichhoff. Berl. Ent. Zeitschr., p. 151 (1868).

On the 28th January 1895, specimens of a small beetle, together with pieces of tea stems riddled by them, were sent to the Indian Museum through Mr. E. E. Green, of Ceylon, from Mr. G. Alston, Superintendent of Tea Estate, Craighead, Nawalapituja.

The insect proved, on examination, to belong to a species of Scolytid beetle, which has not previously been reported to attack tea plants in India. Specimens were therefore forwarded to Mr. W. F. H. Blandford, who very kindly examined them and identified them as belonging to the species *Xyleborus fornicatus*, Eichhoff, a form closely allied to the often destructive species *Xyleborus dispar*, of Europe and North America.

The following is an extract from a letter furnished by Mr. G. Alston :—

"The pest appears mostly in patches, but has spread very considerably since I first observed it in any numbers three years ago. There is no evidence of any previous disease in attacked trees. Most of the trees attacked show no outward sign of the pest, except when almost every branch is attacked, when they turn rather yellow and stop flushing. Young trees about two years old, before they are topped, often snap off at the spot where the borers have made holes for their entrance or exit. Strong vigorous trees in good soil seem to be very little affected by it, and throw out good red wood even from badly bored stems. On the other hand, poor plants on ridges or poor soil seem to naturally feel the effect of it quickly, though in no case have I seen a tree *killed* by it. Isolated branches die off, but new branches come out in their place. As a rule, you can only tell an attacked tree (except in the case of young plants, when the stems snap off) on pruning it, when the holes in the wood are very apparent. It (the beetle) does not attack the cut surface after pruning, but makes its entrance through the bark. In the case of young red wood it very generally goes straight down the pith : in older branches I have often seen the wood riddled as if a charge of snipe-shot had been fired into it, with only one or two

* Published by Authority of the Government of India, Department of Revenue and Agriculture.

minute holes in the bark for exit or entrance. And yet in the case of vigorous trees, they seem to thrive notwithstanding. Since 1893 the pest has spread very much, and become more general, though I cannot say that I see much difference in the fields that were attacked them."

The writer, in the foregoing account of the pest, practically suggests the remedy—namely,—either not to plant in poor soil, or, if the soil is poor, to improve it, and thus to strengthen the plant against the attack—the great object of all medical treatment everywhere.

To prevent the spread of the disease, the affected branches should be cut off and burnt."

It is unfortunate that the very beautiful figures of the above insect—on plate V—cannot be here reproduced. They are Photo etchings executed at the Survey of India offices, Calcutta. and rival any work of the kind that I have seen in England.

The third artiele deals with *Carteria decorella*, a coceid insect allied to the species producing the shellac of eommeree and the lac-dye This inseet has hitherto been eonsidered a strietly Australian form; but has recently been received from Northern India. where it is reported to have attacked tea. We have two allied speeies in Ceylon; but neither of them has so far shown any preferenee for our staple prodnet.

The fourth tea pest is another 'seale-insect,' determined by Mr. Maskell as a variety of *Chionaspis prunicola.* This species has not yet been observed in Ceylon.

The next section is devoted to inseets destruetive to cereals and other crops. A beetle, *Hispa ænescens*, is reported as having eaused great damage to rice erops in India.

"The insects are said to have caused damage to the paddy crop in Poona Taluk. 1,280 acres of land in 10 Amsams are reported to have been affected, and the loss is estimated at 20,000 *paras* of paddy, worth about R10,000."

No remedy is suggested. If this most destructive little insect should appear in any of our paddy fields in Ceylon, prompt measures should be taken to exterminate it before it shall have made headway.

In connection with insect pests of fruit trees, the fact that what the Americans know as "The Red-Scale of Florida"—*Aspidiotus ficus*—is reported as seriously injuring orange and lime trees near Poona, is of some eoneern to us. This speeies is already with us, but I have at present found it only upon rhododendron trees in Nuwara Eliya. In the ease of the affected citrus trees in India, an application of Kerosene emulsion (strength not stated) is said to have proved effectual in exterminating the pest.

On p. 81 is a reprint of an interesting paper by Mr. R. Newstead—the curator of the Grosvenor Museum, Chester,—upon the agency of birds in the destruction of seale inseets. The author finds that the "Blue Tit" and "Long-tailed Tit" devour a eonsiderable number of certain species of Coccidæ in England. Our experienee in Ceylon does not lead me to give much credit to birds as aids in the reduetion of these particular pests. We have many small insectivorous birds: but they either do not appreciate—or, at any rate, do not make much impression upon the bountiful feast provided in a field of bug-infested coffee. They certainly frequent such coffee; but chiefly to feed upon the flies and other insects attraeted by the sweet secretion ("honey-dew") from the scale-insects. It is possible that the "green-bug," *Lecanium viride*, may have developed distasteful qualities that make it unpalatable; or that, being (as I believe) an introduced species, the native birds do not recognize it as an article of diet. The more local species of scale insects may partly owe their comparative rarity to the attaeks of our insectivorous birds.

Altogether this periodical publication from the Indian Museum more than maintains the high standard of interest with which it eommenced some seven years ago.

E. Ernest Green.

A NEW SCHEME FOR CYPRUS.

Professor Patrick Geddes of Edinburgh and Dundee is no ordinary man. By many of his admirers he is considered an extraordinary genius and he certainly never fails to impress all with whom he comes in contact with his own views. The result is that he has carried out some notable schemes in his day. Almost single-handed he started and carried on University Extension Summer Meetings in Scotland. He has been instrumental in rebuilding a great part of High Street, Edinburgh, beautiful and stately houses taking the place of squalid tenements. He has long been interested in the countries bordering on the Mediterranean and attributes the decline of ancient Rome with modern Spain, Turkey and the Ægean to the gradual deterioration of their soil—chiefly due to the eutting down of trees. This he thinks has altered both soil and climate; and he is very strong now on the misehief which has similarly been wrought in Cyprus. He has been writing in the *Contemporary* as well as in London weeklies on a scheme he now has for resuscitating Cyprus. This must be found in afforestation,—"a holy war" Mr. Geddes ealls it which may last a long time, but whieh as it goes on will bring back wealth, health and happiness to the impoverished and degenerate Eastern races. But the Professor does not simply preaeh about afforesting and irrigating: he takes action himself. He is forming a Company to take over two estates in Cyprus already purchased by him; and he has secured Mr. Chamberlain's promise to ask for a grant of £60,000 to be applied to irrigation in the island. Professor Geddes considers Cyprus to be both healthy and safe for British residents: no one has had fever or been molested for 18 years back. The island is also a great centre for the South-East of Europe and when his Company has its farms, fruit gardens, its trees, springs and wells, in flourishing order, there will be a profitable trade outlet available both locally and for export. We feel sure that Professor Geddes will have the good wishes of all who hear of his scheme for the restoration of prosperity to Cyprus—an island of whose scenery and highland people he speaks in most favourable terms.

Planting in Perak and Selangor.—We have culled a good deal of interesting information from the Annual Reports of the several District Officers just published, which will be found reproduced on page 191. Coffee, tapioea, coconuts, pepper and sugar are the products dealt with in Matang of Perak.—Planting in Kuala Langat, Selangor, by Europeans, does not seem to prosper.—But we have Ulu Langat district with a very sanguine account of the future in Liberian coffee, for which a large area of land has been taken up.—Finally, there is Ulu Selangor district where coffee-planting under both European and native auspices, is in progress.

COFFEE NOTES.

In 1895 France imported 142.156.372 kilos of coffee, of which 56.734,903 were from Brazil.

A company of Americans has recently purchased 60,000 acres of coffee, on the Rio Tinto, in the state of Oaxaca, Mexico, and will colonize the tract with several hundred American families.

Experiments have been recently made with hot talc for drying coffee, and excellent results are reported. It is stated that freshly gathered coffee, can be dried in this way in four hours and that the article thus prepared is superior in aroma color and weight to coffee prepared by other processes.—*The Rio News*, July 6.

A SUBSTITUTE FOR COFFEE.

Consul Deuster, under date of April 8, writes from Crefeld :

Believing that it will prove of interest to the malt-coffee manufacturers of the United States, I submi the following report for publication :

Uunder the firm name of Katheriner's Malz-Kaffee-Fabriken, factories have been established in Germany —of which one exists in this consular district, at Merdingen-on-the-Rhine, and others at Munich and Berlin —for the purpose of manufacturing a coffee substitute from cereals. The invention relates to an improvement in preparing the same, which consists in applying to the grain during the steeping process, an electric current proportionate to the quantity and quality of the grain whereby the proteid substances existing in the grain are altered in such a manner that, in the subsequent roasting process, only a small quantity of the products of decomposition (as pyridine and its derivatives which are objectionable to the taste) can be formed, a substitute pleasant to the taste being obtained.

Under this patent, factories have also been established in Austria, Italy, France, Switzerland and Sweden. The inventor has also applied for a patent in the United States.—*American Grocer*, July 7.

NEWS ITEMS.

(From *the Chemist and Druggist*, July 24.)

THE PERFUMERY-TRADE OF NICE.—The manufacture of perfumery goods in Nice is on the increase. In 1896 1,420 cwt., worth 10,684*l*., was exported; the year before 1,120 cwt., worth 8,492*l*.

PARAGUAYAN OIL OF PETITGRAIN.—There has lately been an increase in the shipments of petitgrain oil from Paraguay. The oil is exported chiefly to France. The principal seat of the industry in Paraguay is at Yaguaron, a village about twelve miles from the railway.

ARMOUR'S PEPSIN-FACTORY BURNED.—The *Practical Druggist* reports the destruction of Armour & Co.'s new pepsin factory at Chicago by fire. A terrific explosion was heard in the factory, and almost before the alarm could be sounded the big six-storey building was in flames. Every available engine in the city was set to the fire, which is in the centre of the stock-yards district, and the fire was checked after it had completely destroyed the factory. The building was only completed in May, and the machinery was moved into it ten days before the fire. The explosion which started the fire was in the chemical store room. The damage done is about $75,000.

RINDERPEST IN SOUTH AFRICA.—It is reported from Cape Town that satisfactory experiments have been made with the new method of inoculation discovered by Dr. Edington.

THE ENGLISH DRUG-CROPS.

Only a few weeks still separate us from the season when the English peppermint and lavender plants will be put in the still. According to our custom, we have asked some of the principal growers to give us their opinions of the state of the crops and subjoin some of the replies received :—

Messrs. W. J. Bush & Co. (Limited) say: "We think we are justified in anticipating very good crops both of Mitcham peppermint and lavender oils, especially of the former. It is true that the young cuttings which were planted last autumn suffered severely from the excessive rains, and a large number of them 'damped off' and were lost; but as the weather in the early spring was so very favourable for mint-growing, we know that several farmers planted more cuttings, which have done remarkably well, and, in fact, look as strong and healthy as those which survived the bad weather of the autumn. We are sanguine, therefore, of a good crop, and although the acreage is slightly smaller than last year, we think that the deficiency will be made up by a good yield of oil. So far as lavender is concerned, we believe a good crop will also be obtained. The fields look very healty, and the farmers are getting over the loss of plants which they sustained by the severe weather of some years ago."

Messrs. John Jackson & Co. report: "Our plantations of mint, lavender, chamomile, and rosemary are this year of a most promising appearance, and lead us to expect fine crops. Mints are gratifying to look at, especially the white sorts, which have now become fully developed in most of our fields. In the early part of June both black and white mints were thin and undeveloped, but since then the rain-storms, followed by sunny days and high temperature, have changed the appearance of the vegetation within a few days, and by the end of June the plants were fully expanded, and had taken such a vigorous start that they were covering the soil so thickly and uniformly as to prevent the air circulating round the stems. As a result the lower leaves soon turned yellow and withered, and they may, if we judge from appearance get dry and fall before ripening, thus impairing the coming crop (should this damage become general), as no remedy could possibly avail. Our lavender-plantations are, as a whole very fine, and promise a fair crop. Should this expectation be realised, we may be induced to lower our prices, which for some years past have been kept high, thus causing foreign inferior oils to come in to the market in preference to our higher-grade Mitcham lavender oils. Rosemary is also in a very satisfactory condition, and will, we trust, give us full satisfaction. The chamomile-plants have grown with abnormal vigour, and the first flowers seem generally very small. We fear, therefore, that the undue development of the leaf may lessen the yield of the flowers."

Messrs. J. & R. V. Matthew Brothers say that the peppermint-fields look fairly well, but will not yield a heavy crop if the present dry weather should continue. Lavender is a very indifferent crop, owing to blight; appearances indicate a light yield. Chamomiles look well. Messrs. Matthew Brothers add that these observations refer to their own growth only.

Messrs. W. Ransom & Son, of Hitchin say :—"The prospects of our crops, with one important exception, are fairly good. Henbane, however, is shorter than we have known it for many years, and the prices of extract and leaf ought to be much higher than they are. The belladonna-crop is about equal to last year's. Lavender and peppermint both look well at present, but much will depend upon the weather during the next few weeks. Aconite is abundant; but the prospects for elaterium are hardly up to the average."

It will be seen that our informants, with the exception of Messrs. Matthew Brothers, are unanimous in their anticipation of good crops for the leading essential-oil plants. The Messrs. Matthew's views are in peculiar contrast to those of the other growers and we must say that our own general observations lead us to draw the same conclusions as the majority of our correspondents. But the Messrs. Matthew, it will be seen, expressly state that their statements refer to their own fields only.—*Chemist and Druggist*, July 17.

TEA MACHINERY FOR JAVA.

We understand that Mr. J. H. S. Davidson, nephew of Mr. S. C. Davidson, the inventor of the well-known "Sirocco" Machinery leaves, by the P. & O. steamer "Rosetta" on Saturday next, Aug. 3 for Java in order to superintend the erection of extensive orders for Sirocco Tea Machinery including a number of the newly patented automatic dryers, which machines have proved themselves unequalled in India during the past season. One factory alone about to be fitted will require machinery for 2,000,000 lb. per annum. On one Indian estate alone this new machine dried over 700,000 lb. tea last year, which on the London market averaged ½d more than teas dried by other large tea dryers. Mr. Davidson will also take charge of the erection of a number of Davidson's Patent Rollers, Oxidizers, Downdraft and Updraft Siroccos, Sorters, Packers, etc., numerous orders for all of which machines have been booked for that Island. Mr. J. H. S. Davidson has been a practical planter and engineer for over 8 years, and he will no doubt be able to give a lot of assistance to Java planters.—Local "Times."

ORANGE CULTURE IN CEYLON.

An upcountry planter sends us a copy of the local "Times," marked at an editorial paragraph on "Orange Culture" with notes as appended :—

As a result of the attention drawn to the matter, some planters from upcountry ordered a number of orange plants through a Colombo store-keeper from Melbourne.* The parcel of plants duly arrived here by the last P. & O. steamer in a very healthy condition, and they were despatched in lots on Thursday night by the rail to Veyangoda, Nawalapitiya, Talawakelle, and to a few other places upcountry. We understand that the plants are very choice ones and were selected from a special nursery, and that they cost very nearly R500 laid down at Colombo. They were securely packed in small bags, with the nursery soil, and looked quite fresh and green, but without a single leaf. They promise to do very well, and we shall be glad to know results of their successful cultivation upcountry. The native orange (by the way, is it indigenous ?) like other native products, is not systematically cultivated by the Sinhalese. It is generally believed that oranges grown on the hills are not so palatable as those grown in the lowcountry, and that the Salpiti Korale, Kotte, and the neighbouring villages, produce the best oranges, as the soil there is best suited for their culture. Upcountry, we are told, the plants thrive well, but the oranges do not taste so well as those grown in the lowcountry, though Nuwara Eliya and the Uva Province produce fairly good specimens.† Of course, the oranges grown in Ceylon and India are quite unlike those from Australia and the West our oranges, however ripe they may be, as a rule preserve their verdant hue and do not take on a yellow one, while the taste is a sharper and more refreshing one than the sweet flavour of the oranges met with in Europe. We understand that a large quantity of oranges are imported into Australia during the summer from Italy and Spain, and there is a growing demand for them in the Colonies. Should therefore the experiments now being made upcountry prove a success, there should be no reason why Ceylon should not compete in the Colonies with Spain and Italy.‡ It is a pity that a few lemon plants were not imported as well. The Australian lemons are simply exquisite, and they have a much finer flavour than our Ceylon limes. There is every reason to believe that lemons could be cultivated in our Island as well as oranges.

* Not supplied to C. T. P. Co.'s superintendents for private use.—*Cor.*

† None in N. Eliya and Uva oranges are the worst in Ceylon.—*Cor.*

‡ Meanwhile the Colonies are supplying us not only with oranges but with plants !—*Cor.*

[The original habitat of the Orange is Northern India whence it spread West, East and South. Some species of lime and orange were introduced here from the Malay Archipelago.—ED. *T.A.*]

DRUG REPORT.

(From *the Chemist and Druggist.*)

London, Aug. 12th.

CARDAMOMS.—An Indian correspondent writes: "A very good business was formerly done between Ceylon with Bombay in cardamoms, but the Plague put an end to it, and transferred the trade from Bombay to Calcutta. The principal buyers at that place are the chetties, nd a smart business has been done between them and the native merchants during the last two months, in both Malabar and Mysore cardamoms. About 3 rs. per lb. was paid in June for Mysore, and native merchants were very eager to make advances on crops on estates. But since then there has been a sudden fall in price, and the chetties will not touch the produce now. Very few of their shipments realised any profit at al, and they are now repenting of the high prices they paid for the drug. Large stocks of Mysore cardamoms are held by the na ive merchants, and, with the i flux of the season's new crops, it is believed there will be a further drop in prices." In London the market is fi m, but there is a disinclination to pay the advance asked by owners who have bought at auction.

CINCHONA.—A parcel of fifty-five bales Maracaibo bark has arrived and will be offered at next Thursday's auctions when a lot of 26 packages newly arrived Guayaquil Crown bark will also be offered for sale.

COCOA-BUTTER.—At auction on Tuesday 300 2-cwt. cases of Cadbury's best cocoa butter sold with little competition at a decline of ⅛d to ¼d per lb.—viz. 11⅛d to 10¾d per lb. ; 205 cases Dutch cocoa-butter were bought in at 10¼d to 10¾d per lb.

OILS (Essential).—The quotations from the East are higher. Oil of Citronella u altered Lemongrass held for 2⅜d per oz. on the spot. To arrive no business is reported.

QUININE.—Several small sales, aggregating about 5,000 oz. were made early in the week at 9½d per oz., for fair second-hand German bulk, showing a firm market. The price of the Auerbach brand has been raised to 10d per oz. ; other foreign agents have no definite prices, although Brunswick quinine was erroneously reported in one quarter to have been raised to 10d per oz. Early in the week the B. & S. agents sold two 1,000-oz. lots to druggists at 9d per oz., but since then they have stopped offering. They refused to deal with any but druggists, or to sell more than 1,000 oz. to any one firm. On Saturday a Mincing Lane broker went around trying to buy 5,000 oz. at 9½d, but he appears to have been unsuccessful. Howard's price is unaltered, but Whiffen's is reported to have been raised. Sulphate of cinchonidine has lately been in strong demand for India, and is quoted higher.

TONCA BEANS remain extremely quiet, and no business has been reported lately. Good bright Angostura are quoted at 7s to 8s per lb. ; good frosted Para at from 1s 7d to 1s 10d ; fair black, partly foxy mixed at from 1s down to 5d per lb.

THE DUTY ON COCOA-BUTTER.—In reply to Sir Howard Vincent, the Chancellor of the Exchequer has given some information as to operation of the duty on cocoa-butter. The revenue obtained by the duty has amounted to 3,004*l.* from August 7th, 1896, the date on which the duty took effect, to June 30th, 1897. There are no statistics of the importation of cocoa-butter prior to the imposition of the duty, but, so far as can be ascertained by inquiry of the trade, the quantity of foreign cocoa-butter has increased rather than diminished. This is probably due to the fact that the business in cocoa and chocolate has been very active during the past eight months.—*Chemist and Druggist,* July 17.

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

Colombo, Aug. 31st, 1897.

EXCHANGE ON LONDON: CLOSING RATES. *Bank Selling Rates*:—On demand 1/3 13-16; 4 months' sight 1/3 27-32; 6 months' sight 1/3 7-8 *Bank Buying Rates*:—Credits 3 months' sight 1/4 1-16; 6 months' sight 1/4½; Docts 3 months sight 1/4 3-32; 6 months' sight 1/4 5-32.

COFFEE.—Plantation Estate Parchment on the spot per bushel R14·50 Estate Crops in Parchment, delivery per bus. no quotations. Plantation Estate Coffee, f.o.b. on the spot per cwt. R80·00 Liberian parchment no the spot per bushel, R7·00. Native Coffee unpicked and undried per cwt. R62·00

TEA.—Average Prices ruling during the week Broken Pekoe, per lb. 52c. Pekoe per lb. 41c. Pekoe Souchong per lb. 31c. Broken mixed and Dust, per lb. 21c. Averages of Wednesday's sale.

CINCHONA BARK.—Per unit of Sulphate of Quinine per lb 04c. Scarce

CARDAMOMS.—per lb. R2-18 2,30 for special quality

COCONUT OIL.—Mill oil per cwt. R13·50.

Dealers' oil per cwt. R13·00 Coconut oil in ordinary packages f.o.b. per ton R300. 300 to 307·50 in hogshead

COPRA.—Per candy of 560 lb. R41·50

COCONUT CAKE: (Poonac) f.o.b. (Mill) per ton. 90·00

Cocoa unpicked and undried, per cwt. R41 none offering

COIR YARN.—Nos. 1 to 8 { Kogalla R17·75 / Colombo R16·00

CINNAMON.—Nos. 1 & 2 only f.o.b. 62½c.

Do Ordinary Assortment, per lb 56c.

EBONY.—per ton No sales.

PLUMBAGO:—Large Lumps per ton, R365

Ordinary Lumps per ton, R330

Chips per ton, R180. Dust per ton, R130

RICE.—Soolye per bushel, } R
,, per bag, } R10·25 to 11·50

Pegu and Calcutta Calunda R10·00 to 11·25

Coast Calunda per bushel, R4·20 to 4·50

Muttusamba per bushel, R4·10 to R4·65

Kara per bushel, R4.05 to R4·15

Rangoon Raw 3 bushel bag.—

FREIGHTS.

Cargo.	Per ton London per str.	N. York per str.	Trieste per str.	Mar'lles per str.	Hamb', Bremen &c.
	s. d.	s. d.	s. d.	R. c.	s. d.
Tea	15/	20/	20/	15 25	12/6
Coconut Oil	10/	20/	20/		12/6
Plumbago	10/	20/	20/		12/6
Coconuts in bags	10/	..	20/		12 6
Other Cargo	10/	..	20/		12,6
Broken Stowage	7/65	..	..	..	..
SAILERS.					
Coconut Oil	..	25/		..	..
Plumbago	..	25/	..	..	..

Genoa 7/6

LOCAL MARKET.

(By Mr. James Gibson, Baillie St., Fort.

Colombo. Sept. 1st, 1897.

Esta'e Parchment:—per bushel R14·00 to 15·00 } No business all nominal
Chetty do do do R13·00 to 13·50
Native Coffee } per cwt R50·00 to R55·00
do F.O.B. }
Liberian coffee:—per bushel R6·00 to 7·00
do clean coffee:—per cwt R42·00 nominal

CARDAMOMS.—per lb R2·15 to 2·50

COCOA.—unpicked per cwt R35·00
do picked do R45·00

RICE Market List.

Kazala—per bushel None
first quality Soolai:—per bushel R4.30 very scarce
2nd. & 3rd. do do R4.20 to 4·30 very scarce
Callunda· per bushel R4.15 to 4·30
Coast Kara. do R4.15 to 4·20
Muttusamba. do R4·20 to 4·60

CINNAMON.—per lbs Nos 1 to 4. at 50c. to 60c. } Nominal no
do do 1 & 2 60c. to 65c } b'ness same
do CHIPS.—per candy R60·00 to 80·00 } as last week

COCONUTS.—Ordinary per 1000. R33·00 to 36·00
do Selected do R40·00 to 42·00

COCONUT OIL.—per cwt R13.62
do F. O. B. per ton R303 to 307·50

COPRA.—per Candy:—
Kalpitiya do R38·00 to 41·00
Marawila do R36·00 to 38 00
Cart Copra do R34·00 to 37 00

POONAC.—Gingelly:—per ton R83·00 to 87·00
do Chekku. do R90·00 to 94.00
Mill (retail) do R85·00 to 90·00
Cotton Seed:— do R82·00

SATINWOOD.—cubic feet:—R1·75 to 2·25
Flowered Satinwood do R3·00
Palu: do R1·00
HALMILLA.— do R·50 to 2·00
EBONY.—per ton do R120 to 135
KITUL FIBRE.—per cwt R31·00 to 32·00
PALMYRA, do do R10·00 to 23 00
Jaffna Black.—Clean per cwt R15·00 to 20·00
do Mixed do R16·00 to 18·00
Indian do do R10·00 to 17·00
do Cleaned do R12·00 to 20·00
SAPAN WOOD.—per ton R50·00 to 60·00
KEROSINE OIL.—American per case R7·75 to 7·87
do Bulk Russian per tin R2·78 to 3·00
do Russian in Case R5·60 to 6·00
KAPOK.—Cleaned F.O.B:— per cwt R26·00 to 28·00
do Uncleaned do R5·00 to 6·50
Croton Seed, per cwt; R25 00 to 40·00 no business
Nux Vomica do R5·00 to 6·00 nominal,

Plumbago per ton, according to grade { Large lumps R240 to 380 / Lumps R180 to 360 / Chips R100 to 200 / Dust R 70 to 120

CEYLON EXPORTS AND DISTRIBUTION 1896-97.

COUNTRIES.	Coffee cwt Plan-tation	Coffee cwt N'tive	Coffee cwt Total.	Cinchona. 1897 B'nch & Trunk lb	Tea. 1897 lb.	Tea. 1896 lb.	Cocoa cwt.	C'moms lb.	Cinnamon Bales lb.	Cinnamon Chips lb.	Coconut Oil 1897 cwt.	Coconut Oil 1896 cwt.	P'bago 1897 cwt.
To United Kingdom	9700	..	700	186787	69811298	64304534	21811	190909	621301	176708	52652	4 462	109941
,, Austria	247	2	249	..	14360	29054	..	..	7600	29400	5163	15517	..
,, Belgium	.	1	1	..	9470	24308	86	..	55900	66248	4910	1919	24632
,, France	600	..	600	..	53421	44147	232	...	40900	16160	..	114	307
,, Germany . ..	179	..	179	4132	176575	60699	140	26695	320595	307984	3301	7158	44246
,, Holland . ..	58	.	58	..	15305	3889	..	..	..	..	..	400	891
,, Italy . ..	..	.	..	3132	4014	7257	..	..	100800	61152	269	1207	41
,, Russia	..	..	..	..	305867	220332	..	..	..	..	299	26	..
,, Spain	..	..	..	..	18110	38610	..	..	169760	9240	..	208	..
,, Sweden	250	..	250	..	35123	4925	..	..	..	..	303	402	306
,, Turkey	..	..	..	..	6720	12275	...	..	..	..	..	..	..
,, India	54	..	54	...	642980	672757	5	127079	61	...	102574	46850	342
,, Australia	3353	172	3525	..	8525994	7449355	60	25	2910	29112	2099	1830	630
,, America	..	..	...	263142	547882	373329	47	..	79828	10000	39587	28580	51291
,, Africa	..	..	..	..	147761	51611	..	187	..	..	10	4	..
,, China	45	.	45	23353	420392	161456	..	..	..	..	266	3749	369
,, Singapore	..	35	35	..	19933	48211	599	200	..	..	32282	26973	.
,, Mauritius	..	..	..	..	11790	91790	..	..	..	..	..	..	..
,, Malta	..	..	..	..	43410	103600	..	..	..	..	..	..	..
Total exports from 1st Jan. to 31st Aug. 1897	14486	210	14696	486546	80810435		22980	345095	1399655	704004	243655		232996
do 1896	16820	625	17445	860533	73701539		24752	220259	1255718	509878	182429		225499
do 1895	49605	3597	53202	729038	68122746		22025	250845	1196170	472448	214162		190421
do 1894	20805	587	21482	2102627	60430305		15746	205090	1075001	350671	305468		213962

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Prices Current, London, August 11th, 1897.)

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine cwt.	Fair to fine dry ...	44s a 120s
Zanzibar & Hepatic ,,	Common to good ...	11s a 76s
BEES' WAX, ,,		
Zanzibar & Bombay { White ,,	Good to fine ...	£7 a £8
Yellow ,,	Fair ..	£6 a £6 10s
Madagascar ,,	Dark to good palish .	£5 15s a £6 5s
CAMPHOR, China ,,	Fair average quality ...	95s
Japan ,,	,, ,, ,,	110s
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	3s a 3s 1d
	Middling, stalky & lean	2s 6d a 2s 9d
Ceylon.—Mysore ,,	Fair to fine plump ..	2s 6d a 3s 8d
	Seeds ...	2s 4d a 3s 1d
,, Tellicherry ,,	Good to fine ...	2s 9d a 3s
	Brownish ..	2s 6d
,, Long ,,	Shelly to good ...	2s a 2s 6d
,, Mangalore ,,	Med brown to good bold	3s 3d a 3s 6d
CASTOR OIL, Calcutta ,,	1sts and 2nds ...	3½d a 4½d
Madras ,,	...	3½d
CHILLIES, Zanzibar cwt.	Dull to fine bright ...	20s a 37s 6d
CINCHONA BARK.—		
Ceylon lb.	Ledgeriana Chips ...	1d a 3½d
	Crown, Renewed ..	2d a 4½d
	Org. Stem...	1¼d a 3⅛d
	Hybrid Root ...	2¼d a 2½d
	Chip ...	1¼d a 2d
CINNAMON, Ceylon 1sts per lb.	Ordinary to fine quill...	10½d a 1s 6d
2nds	,, ,, ...	10d a 1s 5d
3rds	,, ,, ...	9½d a 1s 3d
4ths	,, ,, ...	8½d a 1s
Chips	,, ,, ...	2½d a 3d
CLOVES, Penang lb.	Dull to fine bright bold	4¼d a 9½d
Amboyna ..	Dull to fine ...	3d a 4½d
Zanzibar and Pemba }	Good and fine bright ...	2 5-16d a 2½d
	Common dull to fair ...	2d a 2 5-16d
Stems ..	Fair ..	1d
COCULUS INDICUS cwt.	Fair ...	8s 6d
COFFEE		
Ceylon Plantation ,,	Bold to fine bold colory	110s a 118s
	Middling to fine mid ...	104s a 108s 6d
	Low mid. and low grown	97s 6d a 106s
	Smalls ...	86s a 98s
Native ,,	Good ordinary ...	65s a 80s
Liberian ,,	Small to bold ...	40s a 65s
COCOA, Ceylon ,,	Bold to fine bold ...	70s a 80s
	Medium and fair ...	64s a 68s 6d
	Triage to ordinary ...	45s a 55s
COLOMBO ROOT	Fair to good ..	20s a 30s
COIR ROPE, Ceylon ton		nominal
Cochin ,,	Ordinary to fair ..	£10 a £16
FIBRE, Brush ,,	Ord. to fine long straight	£10 a £21
Cochin ,,	Ordinary to good clean	£15 a £21
Stuffing ,,	Common to fine ..	£5 a £6 10s
COIR YARN, Ceylon ,,	Common to superior ..	£12 a £26 10s
Cochin ,,	,, ,, very fine ..	£12 a £34
do. ,,	Roping, fair to good ...	£10 10s a £13
CROTON SEEDS, sift. cwt.	Fair nominal ...	75s
CUTCH ,, ,,	Fair to fine dry ...	9s 3d a 32s 6d
GINGER, Bengal, rough ,,	Fair ...	16s
Calicut, Cut A ,,	Good to fine bold ...	70s a 77s
B & C ,,	Small and medium ..	36s a 68s 6d
Cochin Rough ,,	Common to fine bold ..	28s a 50s
	Small and D's ...	10s a 27s 6d
Japan ,,	Unsplit ...	13s
GUM AMMONIACUM ,,	Sm. blocky to fine clean	17s a 36s 6d
ANIMI, Zanzibar ,	Picked fine pale in sorts	£10 7s 6d a £13
	Part yellow and mixed	£7 17/6 a £10 10s
	Bean and Pea size ditto	70s a £7 12/6
	Amber and dk. red bold	£5 10s a £7 10s
	Med. & bold glassy sorts	80s a 137s 6d
Madagascar ,,	Fair to good palish ...	£4 8s a £8
	,, ,, red ...	£4 5s a £9
ARABIC E. I. & Aden ,,	Ordinary to good pale	40s a 62s 6d
Turkey sorts ,,		56s a 85s
Ghatti ,,	Pickings to fine pale ...	20s a 55s
Kurrachee ,,	Good and fine pale ...	52s 6d a 65s
	Reddish to pale selected	35s a 45s
Madras ,,	Dark to fine pale ...	35s a 40s
ASSAFŒTIDA ,,	Clean fr. to gd. almonds	40s a 80s
	Ord. stony and blocky	30s a 37s
KINO ,,	Fine bright ..	£45 a £55
MYRRH, picked ,,	Fair to fine pale ...	70s a 82s 6d
Aden sorts ,,	Middling to good ...	38s a 57s 6d
OLIBANUM, drop ,,	Good to fine white ...	34s a 60s
	Middling to fair ..	20s a 31s
pickings ,,	Low to good pale ...	11s a 12s 6d
siftings ,,	Slightly foul to fine ...	9s 6d a 14s
INDIARUBBER, Assam lb.	Good to fine ...	1s 9d a 2s 4d
	Common to foul & mxd.	3d a 1s 6d
Rangoon ,,	Fair to good clean ...	1s 4d a 2s 1d
Borneo ,,	Common to fine ..	1s 1d a 1s 7½d

	QUALITY.	QUOTATIONS
INDIARUBBER, (Contd).		
Java, Sing. & Penang lb.	Foul to good clean ...	11¼d a 2s 3d
Mozambique ,,	Good to fine Ball ...	2s 2d a 2s 7½d
	Ordinary to fair Ball...	1s 2d a 2s 1½d
	Low sandy Ball ...	10d a 1s 1d
	Sausage, fair to good..	1s 4d a 2s 5½d
	Liver and livery Ball...	1s 3½d a 2s 1½d
Madagascar ,,	Fr. to fine pinky & white	1s 11d a 2s 5d
	Fair to good black ...	1s 3d a 1s 10d
	Niggers, low to good...	10d a 1s 5d
INDIGO, E.I. ,,	Bengal—	
	Shipping mid to gd violet	4s 4d a 5s 1d
	Consuming mid. to gd.	3s 4d a 5s
	Ordinary to mid. good	2s 10d a 3s 3d
	Mid. to good Kurpah...	2s a 3s 6d
	Low to ordinary ..	1s 3d a 1s 11d
	Mid. to good Madras...	1s 1d a 2s 3d
MACE, Bombay & Penang per lb.	Pale reddish to fine ...	1s 9d a 2s 9d
	Ordinary to fair ...	1s 4d a 1s 7d
	Chips and dark ..	1s 1d a 1s 6d
MYRABOLANES, Madras } cwt.	Dark to fine pale UG...	3s 9d a 5s 6d
	Fair Coast ...	4s 6d
Bombay ,,	Jubblepore ...	4s a 7s
	Bhimlies ...	4s 3d a 9s
	Rhajpore, &c. ..	5s 9d a 7s
Bengal ,,	Calcutta ..	3s 6d a 5s 6d
NUTMEGS— lb.	64's to 57's ...	3s a 3s 2d
Bombay & Penang ,,	112's to 67's ..	1s 3d a 2s 11d
	160's to 130's ..	8d a 1s 2d
NUTS, ARECA cwt.	Ordinary to fair fresh..	12s a 14s
NUX VOMICA, Bombay per cwt.	Ordinary to middling...	4s a 6s 6d
Madras	Fair to good bold fresh..	7s a 7s 6d
	Small ordinary and fair	6s 6d
OIL OF ANISEED lb	Fair merchantable ...	8s
CASSIA ,,	According to analysis..	5s a 7s 6d
LEMONGRASS ,,	Good flavour & colour...	2⅝d
NUTMEG ,,	Dingy to white ...	3¼d a 4d
CINNAMON ,,	Ordinary to fair sweet...	4d a 1s 3d
CITRONELLE ,,	Bright & good flavour...	1s 1½d a 1s 2d
ORCHELLA WEED—cwt		
Ceylon ,,	Mid. to fine not woody...	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf ...	10s a 15s
	,, wiry Mozambique	10s a 11s
PEPPER—(Black) lb.		
Alleppee & Tellicherry	Fair to bold heavy ...	2¾d a 3⅛d
Singapore ..	Fair	3⅛d a 3 5-32d
Acheen & W. C. Penang	Dull to fine	2 7-16d a 2⅞d
PLUMBAGO, lump cwt.	Fair to fine bright bold	15s a 17s 6d
	Middling to good small	3s 6d a 13s
chips ,,	Dull to fine bright ..	1s 6d a 8s 9d
dust ,,	Ordinary to fine bright	2s a 6s
SAFFLOWER ,,	Good to fine pinky ...	80s a 85s
	Middling to fair ...	60s a 70s
	Inferior and pickings ...	50s a 55s
SANDAL WOOD—		
Bombay, Logs ton.	Fair to fine flavour ..	£20 a £35
Chips ,,	... ...	5s a £3
Madras, Logs ,,	Fair to good flavour ..	£30 a £50
Chips ,,	Inferior to fine ...	£4 a £8
SAPANWOOD Bombay ,,	Lean to good ...	£4 a £5
Madras ,,	Good average ...	£4 a £5 nom.
Manila ,,	Rough & rooty to good	£4 10s a £5 15s
Siam ,,	bold smooth...	£6 a £7
SEEDLAC cwt.	Ord. dusty to gd. soluble	70s a 80s
SENNA, Tinnevelly lb.	Good to fine bold green	4d a 8d
	Fair middling medium	2¼d a 4½d
	Common dark and small	1d a 2d
SHELLS, M. o'PEARL—		
Bombay cwt.	Bold and A's	£5 7/6 a £5 12/6
	D's and B's	£4 7/6 a £5 12/6
	Small	£3 17/6 a £4 7/6
Mussel ,,	Small to bold ...	20s a 55s
TAMARINDS, Calcutta...	Mid. to fine bl'k not stony	7s a 8s 6d
per cwt. Madras	Stony and inferior ..	4s a 6s
TORTOISESHELL—		
Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	18s a 25s
TURMERIC, Bengal cwt.	Fair	10s a 10s 6d
Madras ,,	Finger fair to fine bold	16s a 17s
Do. ,,	Mixed midlng. [bright	12s a 13s
Do. ,,	Bulbs	8s a 9s
Cochin ,,	Finger	12s 6d
	Bulbs	7s 6d
VANILLOES— lb.		
Mauritius and Bourbon } 1sts	Gd. crystallized 3½ a 9 in.	19s 6d a 33s
2nds	Foxy & reddish 4½ a 8 ,,	17s a 26s 6d
Seychelles 3rds	Lean and inferior ..	12s a 26s
VERMILION lb.	Fine, pure, bright ...	2s 1d a 2s 2d
WAX, Japan, squares cwt.	Good white hard ...	42s 6d

THE

AGRICULTURAL MAGAZINE,

COLOMBO.

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Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for September :—

SEASON REPORTS.

WESTERN *Province.*—Paddy. Yala crop thriving, preparations for Maha going on in some places. Fruits and vegetables plentiful in Colombo district and Rayigam Korale. Rainfall sufficient.

Central Province.—Paddy. Maha cultivation begun; rainfall at Matale 3·38 in.; a case of alleged murrain reported from Matale South. A good supply of fruits and vegetables in Nuwara Eliya.

Northern Province.—Paddy. The threshing of the Kalapokam paddy crop is nearly over every where; where Sirupokam paddy was sown the crop is about to be harvested. No rain in Jaffna and Mannar districts, but few showers in Mullaittivu.

Southern Province.—Paddy. Yala crop in course of being harvested. Rainfall in Galle 5·26 in.

Eastern Province.—Paddy. Pinnari cultivation somewhat interrupted by rain and flood in Batticaloa, in Trincomalee satisfactory and promises well. Cattle murrain still lingers in some villages, but is being stamped out. Rainfall, ·51 in Batticaloa, and ·95 in Trincomalee.

North-Western Province.—Paddy. Crops in various stages, but good yields are expected ; no murrain except in Hiriyala Hatpattu. Rainfall at Puttalam ·69 in.

North-Central Province.—Paddy. Crop nearing harvest and prospects good. No cattle murrain. Rainfall at Anuradhapura ·10 in.

Province of Uva.—Paddy. Maha harvest over, yield good. Vegetables scarce and dear. Health of cattle good.

Province of Sabaragamuwa.—Paddy. Yala crop prospects good. No reports of cattle murrain. Rainfall at Ruanwella 8·63 in., same in Ambanpitiya.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF AUGUST, 1897.

1	Sunday ..	·06	17	Tuesday ..	·25
2	Monday ..	Nil	18	Wednesday..	Nil
3	Tuesday ..	·13	19	Thursday ..	Nil
4	Wednesday..	·02	20	Friday ..	Nil
5	Thursday ..	1·43	21	Saturday ..	·02
6	Friday ..	·57	22	Sunday ..	Nil
7	Saturday ..	·07	23	Monday ..	1·33
8	Sunday ..	Nil	24	Tuesday ..	1·10
9	Monday ..	·61	25	Wednesday ..	Nil
10	Tuesday ..	2·14	26	Thursday ..	·35
11	Wednesday..	1·85	27	Friday ..	·27
12	Thursday ..	·50	28	Saturday ..	·07
13	Friday ..	·10	29	Sunday ..	·08
14	Saturday ..	·41	30	Monday ..	Nil
15	Sunday ..	·03	31	Tuesday ..	·02
16	Monday ...	Nil	1	Wednesday..	Nil

Total..11·30
Mean.. ·36

Greatest amount of rainfall in any 24 hours on the 10th, Tuesday, 2·14 inches.

Recorded by A. R. JEREMIAH.

THE LABOUR QUESTION.

The Labour difficulty in Ceylon cannot be expected to decrease with the increase of plantations. The formation of large companies of late years, and the opening up of extensive tracts of land in the Balangoda district by Messrs. Finlay, Muir, & Co. chiefly, have created a great demand for large gangs of coolies. And as all the required fresh labouring hands are not brought over from

the coast, the home of the immigrant labourer, it follows that the required forces are in great measure drafted from the already existing plantations. No great foresight is therefore needed to prophecy that the simple plan of taking from Paul to pay Peter, or from Peter to pay Paul is not conducive to their mutual benefit.

In the meantime, as the shifting of labour is the direct result of immediate or prospective gain to the labourers, advances on coolies have gone on increasing all over the Island. To what extent advances have already risen is shown in the evidence afforded in the late desertion case of Rowlands *vs.* Valliamma. It appears that the sum of R274·50 was not considered too high for two women and one boy. And this brings us once again to

THE LAW OF CONTRACTS.

It is unfortunate that Superintendents do not regard in all its gravity the requirement that the contract of hire and service is one that should be entered into directly with the labourer and not with the kangani.

It is often the case that negotiations are carried on entirely with the kangani who offers to place the labourers on the estate upon the payment of a certain sum of money, which is called an advance.

In the case under consideration, the advance per head amounts to as much as R91·50, a sum considered high for Ceylon even by Mr. Justice Withers. The Superintendent, Mr. Rowlands, naturally thought that all things and conditions were done and fulfilled by him to entitle him to consider that the labourers who found their way to his estate, were to all legal intents and purposes his servants. If the entry of the servant's name on the check roll, the occupation by them of rooms in the lines, and the receipt of a few measures of rice were elements that sufficed to support an implied contract, how much more would not the payment of so large a sum of money to save the cooly from his persecuting creditors, the Chetty dealer and the Moorman trader, afford confirmatory proof of a contract between the labourer and the Superintendent,—so at least must have thought the Superintendent.

But the Court held that there was no contract proved between the parties to support the charge of desertion. It cannot be too often repeated that the requirements of the Labour Ordinance should be strictly adhered to by the employer before he could claim the benefit of its provisions, so as to bring an offender before a summary Court of Justice as a criminal.

The subject of advances to coolies is one that has engaged, no doubt, the best attention of the foremost planters in the Planters' Association, among whom too are men of legal attainments, and it has more than once been recommended to the Planting community by those best able to foresee difficulties, that advances should be made to the labourer direct and not to the kanganies.

The usages and customs between planters and coolies which obtained in the past, and were regarded as a sort of unwritten or common law have gradually come to the ground, and in the present day the planter who relies on these usages reckons very frequently without his host.

It has been contended that this is not a practical suggestion. It may or may not be so; but now that advances are going up gradually to three figures per head it would not be out of place to state that whatever may be the conveniences afforded by the system of making advances in a lump sum into the hands of the kangani to enable him to pay the debts due by his gang, or by cheque to the employer who sends out his "tundu," it would be well for the Planting community to consider whether they should not introduce a rule, that in all cases new coolies should be individually seen by the Superintendent upon their arrival, and whenever it is practicable that the advances should be ascertained as separate debts and placed against each man and woman as stated or acknowledged. Such acknowledgement by cooly and entry by Superintendent cannot fail to be of service to the Superintendent in Court.

And if such a system had been in vogue among planters, the case under review could not possibly have failed from a want of evidence of the contract to serve, since to acknowledge the receipt of the advance parties had to meet face to face as master and servant.

In the case of Rowlands *vs.* Valliamma the Superintendent has not only failed in the case of desertion, but stands a slender chance of recovering his advances from the three coolies to whom he granted a "tundu."

OCCASIONAL NOTES.

The two varieties of paddy seed received from the Agricultural Department of Madras some time ago were sown in the School of Agriculture grounds last sowing season and the crops are now coming into ear. We owe our thanks to the Director of Land Records and Agriculture of the North-Western Province of India, for three varieties of paddy received from Cawnpore. The seed paddy we have been so fortunate as to secure was sent on our application for the best approved varieties. Some of this seed will be grown at the School of Agriculture and the rest in the Matale district.

We make no apology for publishing in full the Report of the Superintendent of the School of Agriculture on the working of the several establishments under his charge during last year. Few of the public have the opportunity of reading the Administration Reports of heads of departments, and we have no doubt that there are many who will be glad to note the progress made by the dairy, and to be provided with the financial details of the concern. Owing to the publication of this report a good deal of other matter has to stand over.

The Colonial Veterinary Surgeon thus refers in his report for last year to the "obscure disease" more than once written about in the pages of the Magazine, and once treated of under the head of "Hepatitis":—During the year several cows appeared to be slightly unwell at intervals and to change colour gradually, principally white cows. The first thing noticed about

them was that they panted a little during the heat of the day, and for this laxatives and saline febrifuges were administered. In two or three weeks, on closely examining the skin, bluish hairs could be detected mixed with the white. This gradually advanced until the colour of the animal was a distinct bluish gray. In a few weeks more the shade gradually changed to brown, finally developing into dark brown. At the same time the hair grew very long, making the animal appear to have developed a thick winter coat. The skin itself also tends to become darker in colour. In connection with this change in colour the animals very gradually became thinner, appearing to grow smaller in size, and gradually ceased milking (if a milk cow). In all other ways there was nothing to be noticed, so that a stranger would not observe anything wrong. I did not have an opportunity of a post-mortem examination, as there were no deaths. I have noticed on one or two occasions odd cases at the public sales in Colombo exactly similar to those I have described, but as far as I have been able to learn it was not recognized as a disease. Professor Wallace, the eminent Agriculturist, saw these cases when in Ceylon and suggested liver disease. I was convinced the change was of a pathological nature. Consequently, I sent a photograph of one animal and specimens of its hair to the Royal Veterinary College, London, to an eminent pathologist, whose reply was as follows:—"The cases to which you refer are certainly remarkable, if the change in colour of the skin and hair is really pathological. I never heard of such a thing, and am quite at a loss to account for it....I shall be glad if you will let me know what the further progress of the cases was, and whether you have observed any other cases of the same sort since you wrote." I may mention that all the cases I saw were imported animals. I am unable to give a definite opinion upon the nature of the change, but my impression is that it is due to morbid change of the blood glands of the liver, due to the changed mode of life and feeding upon rich food. In one case, a white Coast cow, the change in colour developed in patches, which gradually became larger and confluent.

We acknowledge with thanks the receipt of five copies of a pamphlet containing Dr. Koch's reports on experiments conducted by him for the discovery of a cure and a propylactic for rinderpest, sent to us by Vet. Major Mills, Principal of the Bombay Veterinary College. These reports were published in the pages of the Magazine from time to time, but as now presented they form a handy little book of reference. The pamphlet is published with the sanction of the Government of India.

FRUIT CULTURE.

The physiological facts referred to in our last issue are what all successful tree culture is founded on, whether the workman knows and intelligently applies them, or whether he follows empirical rules that have been taught him without explanation of the reason for them. They show that compact unærated ground, which has never been mixed up with its own bulk of air by trenching to something more than the depth to which average roots penetrate, is not fit to grow trees. They show that the unfitness is only locally and partially rectified by digging out a two or three foot hole and making its earth contents as loose, ærated and open as the whole orchard ought to be. They show that when the advancing root system of the trees has got beyond the poor thirsty dozen cubic feet of decent soil in its hole it reaches the compact earth walls around it and progress is barred. If the feeding tips force their way in, there is little or no air, and they cease to respire freely. If they coil back upon the loose earth in the hole, they find it impoverished, for it is their leavings of former years. Of course the trees' demands are just as great as ever, but the stifled rootlets in the hard untrenched soil and the famished ones in the hole space cannot supply them. Then follows a lingering period of death, more or less drawn out according to circumstances. The young wood of the year dies back, making the well-known appearance that gardeners have likened to stag's horns. This fatal error of insufficiently trenching up land meant for orchard purposes and relying on the contents of small artificial pits is one of the reasons why fruit trees that do not get fair play are so shortlived.

Again, in watering, what do we do? We pour it on the depression round the tree till the hollow is full and bubbles of air keep coming up in the pond that has been formed. Where are the air spaces which we saw were so essential for the vitality of the roots? Why, every bubble of vital air has been drowned out and forced to ascend and escape at the surface. What should be full of air is now full of water. The roots are completely immersed and their respiration is stopped. Fortunately this state of things does not last long. Even the most compact-clays slowly absorb water, and the destructive surplus percolates away through their substance, relieving the asphyxiated roots and making way for air to enter from the surface. The repetition of this drowning process several times a week is a common cause of the dropping of fruit, the dying out of the special young shoots of the year, and the general short space of life allotted to a neglected orchard on any other than a sandy open soil.

Successful culture depends upon the degree of completeness with which we can make our soil resemble the mechanical condition present in a sponge. We must recognise that trees do not grow in earth alone, but in a mixture of earth, air and water. That mixture is *soil,* if the word is properly understood. Our endeavour should therefore be to bring earth into the condition of soil, for between the two there is something of the difference that exists between the rudest barbarism and a high civilization. Little or nothing is possible to the former, but everything is possible to the latter.

NOTE ON GREVILLEA.

Grevillea robusta, which makes such a usefu and ornamental windbreak in our tea plantations, has been ascertained to draw from its soil for nourishment so little of the properties demanded by the tea, that its presence is rather an advantage than otherwise in the opinion of many planters even as regards the yield of the bushes round about them; but one curious feature has been noted in places where occasionally a Grevillea dies out, and that is that the tea in the neighbourhood of its roots dies out also. It is impossible to account for this phenomenon without a careful examination of the roots of the Grevillea. A few years back a mycelium which affected patches of cocoa in the West Indies was traced by the Director of the Botanic Gardens, Leeward Islands, (Mr. C. A. Barber) to the dead stumps in the ground which started the root fungus that spread so rapidly and with such disastrous effects to the cocoa.

Whatever may be the causes leading to the destruction of the tea at the foot of the dying Grevilleas, it would not be amiss in all cases to have the roots of the latter taken off the ground as far as it is possible along with the dead stumps occurring in tea fields.

REPORT OF MR. C. DRIEBERG, B.A., F.H.A.S., SUPERINTENDENT OF THE COLOMBO SCHOOL OF AGRICULTURE.

THE SCHOOL.

The number of students in the school has never been allowed to exceed twenty-five at any time, as the dieting vote does not permit of a larger number being provided for. As a rule, however, applications for admission have been in excess of our requirements, but in 1896 the applicants were few, and when the usual examination test for admission came to be applied, it was found that there were less than a dozen eligible students. The falling off is attributable to certain alterations in the conditions that attach to studentship at the school, made by the then Acting Director, as well as to the fact that the boarding fees were raised. But the reversion to the old order of things will, I expect, in spite of the higher boarding fee, give to the school its full complement of students next year. As yet no separate vote has been allowed for special agricultural work in connection with the school, but in spite of so serious a drawback some work of this nature was done. A cheap and light type of plough (weighing about 25 lbs.) was designed and constructed, and serves its purpose well. Trials were made with blood manure as prepared in Colombo, and "Homco," a vegetable manure meal manufactured from rape and other oil seeds by the Hull Oil Company. The makers kindly placed a ton of the latter at my disposal free of all cost, and I am glad to be able to report for their satisfaction that "Homco" has given excellent results with garden crops and acted more quickly than blood. The manure is also being tried on coconuts and other planting products in various parts of the Island, but it is yet too early to judge of the results of these trials, though so far reports received have been favourable. The following is an analysis of "Homco," as supplied to me, by Dr. Bernard Dyer:—

Moisture (loss at 212° F.)	11·82
Organic matter*	80·58
Phosphoric acid†	2·36
Lime	1·02
Magnesia, alkalies, carbonic acid, &c.	2·27
Insoluble silicious matter	1·95
Total...	10 000
* Containing nitrogen ...	5·48
Equal to ammonia ...	7·09
† Equal to tribasic phosphate of lime	5·15

The Company guarantee $6\frac{1}{2}$ per cent. of ammonia and less than 3 per cent. sand. The price of "Homco," guaranteed to contain from $6\frac{3}{4}$ to 7 per cent. ammonia, in double bags, free on board, London, is quoted at £3. 5*s*. per ton.

The vine experiments had unfortunately to be abandoned, much to the disappointment of many intersted in the venture, as satisfactory arrangements between Government and Mr. Zanetti, the viticulturist, could not have been made for its continuance. The experiment, while it lasted, was decidedly promising, and went to prove that, under suitable conditions and intelligent management, the "extensive" system of grape cultivation, according to continental methods, ought to be a success in Ceylon. As a result of the experiment a few landowners have begun growing vines on their own account, while it is satisfactory to know that about a thousand vines of the finest cultivated varieties have, by sale, been distributed throughout the Island. It is to be regretted that the experiments could not have been kept up at the school till the vines had reached the full-bearing period.

I am daily expecting half a ton of "Jadoo fibre" which the manufacturers are sending me free of cost from Exeter. This growing medium has been brought prominently to the notice of the agricultural public, and I am most anxious to give it a fair trial. It has already been highly spoken of as being of the greatest service in "supplying" tea plants in nurseries, in propagating by cuttings, and especially in pot-culture.

I have also been in communication with the manufacturers of "Natragin" in Höchst-on-the-Mainand hope beforel ong to be in a position to say, whether pure cultivation bacteria for leguminous crops are likely to be of practical value in the agriculture of the Island.

As in former years, a large number of inquiries were received and answered, while such seeds and plants as were available for distribution were supplied to those who applied for them.

It is to be hoped that before long the School of Agriculture will be placed on an independent footing, so that its interest may be specially cared for and not sunk in the general interests of a complex establishment of which it is now but an unit—without a proper status, scheme, or vote of its own, and without the means of fulfilling the true functions of an agricultural school.

During the year the Government dispensed with the services of the agricultural instructors, as it was thought that the results of the work of these officers were not sufficiently fruitful to warrant

their retention. An exception was however made in the case of the instructor at Balangoda (Mr. H. D. Gunasekara), who at the special request of the Government Agent of the Province of Sabaragamuwa was kept on. This officer, who has a good record of work to show, is at present engaged in establishing an experimental farm at Mahawalatenne, where the cultivatiou of economic and medicinal plants as well as the breeding of cattle and poultry will receive attentiou. The experiment should prove an interesting one, aud with the liberal help of the Ratemahatmaya (Mr. C. D. Mahawalatenne), and the patronage of the Government Agent, should not fail for want of support or for lack of enthusiasm on the part of the instructor.

On the discontinuance of the agricultural instructors I forwarded the annexed report to Government, submitting suggestions for re-organizing and better equipping the school and for carrying ou its work on more practical lines.

It is a difficult matter to show the exact expenditure on the School of Agriculture as distinct from the expenditure on the other schools located in the same building, and this fact has led to incorrect estimates of the actual cost of the school to Government. But making as fair a calculation as possible, the cost of the School of Agriculture does not exceed Rs. 6,000 per annum.

The "Agricultural Magazine" in a slightly enlarged form is still kept up: it is now in its eighth year, and is, I venture to think, of good report. Though the work of editing is rather a tax on my time, the magazine has proved of great service to me as a medium of communication with other countries, where it has been accepted in exchange for agricultural publications which I would otherwise have no opportunity of seeing. I am glad to state that the Government has allowed a bonus of Rs. 150 per annum for the publication of the magazine, and I should here wish to record my gratitude for the concession. My thanks are specially due to the Indian and Tasmanian Governments for their liberality in supplying me with their valuable reports and bulletins free of cost.

THE SCHOOL OF FORESTRY.

This school started work on the 15th of April with six students (a limited number), three of whom were drafted from the Forest Department, and the remaining three selected from the students of the School of Agriculture after competitive examination. The following is a list of the subjects taught, with the names of the teachers annexed:—

Forestry	...Mr. Broun, Conservator of Forests.
Mathematics	...Mr. Walter Parys,
Forest Law	...Mr. F. M. de Saram, Advocate.
Surveying	...Mr. Dyson Blair.
Botany	...Mr. C. Drieberg, Superintendent, School of Agriculture.

The course of training as at present arranged covers one year. During the latter part of the year the students were taken on tour by the Conservator of Forests himself. The tour occupied about six weeks, during which period many of the forests of the North-Western and Central Provinces that lie on the route between Kurunegala, Dambulla, and Matale were traversed, while visits were also paid to the Galboda, Nanu-oya, and Nuwara Eliya plantations. The six students who will be the first trained in the Forestry School are Messrs. Jansz, Jayman and Galagoda of the Forest Department, and Messrs. Fernando, Mendis, and Ratnayaka from the School of Agriculture.

THE TRAINING SCHOOL.

The number of students trained at one time in this school was, until 1896, ten; but during the year this number was reduced to five as the result of the opening of a training school in Peradeniya, which was inteuded specially for the training of Kandyan teachers for Government vernacular schools in the Central Province.

THE PRACITSING SCHOOL.

The Practising School, conducted in connection with the Training School, has about 80 boys on the roll and an average attendance of about 50. The school is a purely vernacular day school. Situated as it is in the metropolis and in a more or less remote suburb, it is not takeu advantage of as much as it would be if it were an Anglo-vernacular institution. The demand for an English education is naturally keen in the neighbourhood of Colombo, and native parents of the poorer class are satisfied with a IVth or Vth Standard vernacular education for their sons, who are then given the finish in English which qualifies them for the higher grade appointments as domestic or office servants. For this reason the highest standard that can at present be maintained in the school is, much to the disadvantage of the training students, the Vth.

THE GOVERNMENT DAIRY.

All things considered, the dairy has had a fairly good year. I have endeavoured to curtail my report on this institution by arranging facts and figures in tabular form. Statement A. is a return of the stock. The dairy was free from of any form epidemic, but, as will be seen from the return furnished, a comparatively large number of calves was lost during the twelve months. The causes of death were worm-complaint and other common ailments, which unfortunately could not have been coped with so successfully as in former years. Statement B. shows the quantity of milk supplied during the year. I have included this statement in order to show that the demand for milk varies within comparatively wide limits from month to month. It will be seen that the demaud rose continuouly towards the latter part of the year.

These circumstances, and the difficulty experienced in procuring additional stock when required, made it necessary for the Manager to supplement the output of milk at the dairy with milk purchased from outside. But the impossibility of obtaining pure milk in any quantity from external sources uaturally gave rise to some unpleasantness with the Medical Department, which it is to be hoped will be avoided in the future.

I would urge upon those who rely upon the lactometer as a test for the purity and quality of milk to see that their instruments are correct by trying them with pure water reduced by ice to a temperature of 60° F., and if found correct to add 4 to the reading of the lactometer at 85° F. and 5 to the reading at 90° F. The temperature of milk should always be taken in Ceylou before using the instrument. Believers in the lactometer would do well to bear iu miud (1) that milk can be made to show a high specific gravity by adding foreign matter,

or (what is simpler) by *abstracting* some of the cream by a few turns of the cream separator; and (2) that milk abnormally rich in cream has a specific gravity *below* the normal. In the face of these paradoxical results it will be admitted that the lactometer may often lead its owner astray. My opinion of the instrument is founded on my own experience of its use and on numerous careful tests that I have carried out; but if any one desires to have the views of an acknowledged authority on the subject, I would refer him to Dr. Wauklyn, who, in his work on "Milk Analysis," speaks in this wise:—"From a careful consideration of the whole subject I am convinced that one of the most necessary steps to be taken in milk analysis is to abandon the use of the lactometer."

Statement C. shows the work of the Dairy during the year and needs no explanation.

During 1896, 18 cows were purchased at a cost of R2,510, while 22 cows and 25 calves (9 with their mothers) were sold, the sum realized after paying all the incidental expenses of the sale being R1,257·06.

D. is a financial statement for the Dairy Farm (including Government Dairy, Dairy grass lands, and Model Farm) for the year 1896.

Statement E. shows the financial position of the Dairy Farm in its relation to Government.

F. is a statement of the assets and liabilities of the Dairy Farm. In this last statement no credit is taken for a sum of R4,400 which was paid out of Dairy Funds as compensation to the late lessee of the Model Farm, though the amount is recoverable as value of the "good will" from any future lessees.

GRASS LANDS ATTACHED TO THE DAIRY.

These lands, cultivated with Mauritius grass, constitute the chief source of the Dairy's grass supply. The area under regular cultivation covers an extent of 20 acres. The net income for the year was R776, but this amount should be greatly enhanced as the result of new arrangements for working the lands next year.

THE MODEL FARM.

In the management of the Model Farm (about 220 acres in extent) I have had valuable assistance from Mr. Samaranayaka, an Assistant Master in the School of Agriculture. The total receipts of the Farm in 1894 were R2,506·90; in 1895, R3,001·36; while in 1896 they amounted to R4,269·72.

The expenditure incurred solely on Farm account was R403·89, but an additional sum of R849·77 had to be expended on account of the dry cattle sent there from time to time from the Dairy, so that the total expenditure amounted to R1,253·66, leaving a credit balance of R3,016·06. Deducting from this a sum of R1,350 payable annually as rent to Government, the net income from the Farm stands at R1,666·06.

The pasture land at the Model Farm is not of the best character, being considered by the Veterinary Surgeon too low-lying and wet for the cattle. With the leasing of the Havelock Race-course by the Dairy there will be less occasion for using the Model Farm for pasturing purposes.

The greater part of the high lands of the Farm were during the year laid out as golf links, and named after His Excellency the Governor "The Ridgeway Links."

THE HAVELOCK RACECOURSE.

This was taken on lease by the Dairy from October. It covers an area of over 80 acres, and affords good pasturing for the stock, thus enabling the Manager of the Dairy to make a reduction in his expenditure on grass for "soiling" The proximity of the racecourse to the Dairy is its chief merit, making it possible for it to be used as an exercising ground for the milking cows as well as the rest of the stock. In this way it becomes of special value to the Dairy, which has no suitable land for exercising cattle on the premises. A rental of R60 per mensem is paid to the Ceylon Turf Club for the monopoly of the grazing.

C. DRIEBERG, B.A., F.H.A.S.,
Superintendent.

REPORT by the Superintendent of the School of Agriculture, Colombo, submitting suggestions for the re-organizing and better equipping of the School, and for carrying on the work of the Agricultural Branch of the Educational Department on more practical lines.

Introductory.—Since the School of Agriculture was established in 1884, the departmental policy, which has been pursued in the attempt to bring the native cultivators of the Island under the influence of modern agricultural teaching, as well as to further their interests by adopting such measures as would tend to facilitate their work and improve their condition, has virtually been left to the agricultural instructors to work out. It must needs be inferred, however, from the action of Government in discontinuing the instructors, that the plan hitherto followed, whether owing to the nature of the policy pursued or the manner in which it was sought to carry in into effect, has been found wanting. Under the circumstances I deem it my duty to submit an alternative scheme, drawn up on more practical lines, and, as I consider, better calculated to benefit cultivators in Ceylon. The failure of a first attempt to reach the native agriculturist, so far from deterring the Department from persevering in its efforts, and warranting the desertion of the cause of native agriculture, would, on the other hand, seem rather to call for a fresh attempt on new lines, which later experience may suggest. For this reason I would urge that the vote for agricultural instructors be not allowed to lapse nor be appropriated for other purposes, but utilized for the re-organizing and better equipping of the School of Agriculture, and for carrying on the work of the Agricultural Branch of the Educational Department with better effect.

Site.—The availability of the old Normal School buildings no doubt suggested the idea of locating the School of Agriculture where it now stands, but the site, as far as its suitability for agricultural experiments is considered, has proved an unfortunate selection. The extremely poor character of the soil and the difficulties that stand in the way of draining the land have been serious obstacles to the success of the practical part of the work of the school.

Staff of Coolies and upkeep of Grounds.—At present the staff of servants is composed of a messenger or peon, a room boy and indoor cooly, and two outdoor coolies. It will thus be seen that there are only two hands available for the upkeep

of the grounds. I have often had to meet the reaproach that the premises are not maintained in an efficient state; but how could this be expected with only two garden coolies at my disposal? I see no reason why the premises should be behind the Victoria Park or Museum grounds in efficiency, both of which institutions are allowed the necessary votes for upkeep.

Originally the school had an isolated situation with a good deal of waste land lying about it; now it is the centre of a much-frequented public resort, and it is a pity that under the circumstances it should wear a neglected [appeerence. Apart from this consideration, it is important that the surroundings of the students should present lessons in neatness and method; and the garden offers possibilities of being well laid out. I would suggest that a staff of six (*i.e.*, an additional four) outdoor coolies—two good gardeners and four ordinary coolies—be attached to the school. The services of these men would be also available for helping in such cultivation as the students may be engaged in, as it is a difficult matter to carry on systematic work of any extent with the limited amount of labour derivable from the students.

Improvement of Native Implements.—In the early days of the school, and before it came into my charge, a large number of English ploughs were purchased both for the school and for the use of the agricultural instructors, but these implements were eventually found to be unsuitable for the purposes of native cultivation. The purchasing of these ploughs, before at least carrying out preliminary trials with specimen implemeuts, was a mistake. Subsequently a specially-designed plough—called the "Cingalee plough"—was constructed, which, it was thought, would meet the requirements of paddy cultivators, but even this implement did not find favour with them, as it was considered too heavy. Since then no ploughs have been purchased in connection with the work of the school. In spite, however, of past failures, I think that there is still an opportunity of doing good work in the way of facilitating and improving the quality of the work of the native cultivator in the preparation of his land, by further attention to the question of implements. The great point to be attained in the matter of ploughs is to persuade the cultivator to adopt an implement that turns over the soil, which the so-called plough commonly in use does not do, since it has no mould-board—an essential element in every plough. Another mistake that was made in the endeavour to supersede the native implement was to force a novelty in the shape of a foreign plough on the cultivator. The better way of going to work would have been to improve upon the defective implement, and, though earlier alterations may not have been sufficiently effective, to gradually evolve the most approved plough for local requirements, so that the operation of ploughing might be more thoroughly and quickly done than it is now: the modern English plough has been the outcome of such gradual evolution. Another matter which policy would have suggested in dealing with notoriously conservative class is, that the improved implement should have been locally manufactured. I believe that a plough which will meet the requirements of the native cultivator can be made locally. I have had ploughs weighing only 24 or 25 lb. constructed by native blacksmiths, and these have worked and worn well. I would suggest that the opportunity be afforded to the school for making another attempt, on the lines I have indicated, towards the improvement of the native implements now in use, as well as the introduction, if possible, of other implements and machines—simple forms of sowing and drilling machines such as are now in use in India, for instance—which are calculated to improve the condition of native agriculture. For a beginning, specimens of these latter might be secured for the school for trial and report, and if found suitable one or two of each might be kept at convenient centres, such as Kachcheries, and on application being made to the officers connected therewith the use of the implements or machines allowed and, if necessary, a small fee charged. Again, by exhibiting select implements and machines, and demonstrating their uses and advantages at agricultural shows or special gatherings convened at suitable centres, much can be done to bring them to the notice of cultivators.

New and improved varieties of Seeds and Plants.—Another important matter about which the School of Agriculture should concern itself is the distribution of seeds and plants. It is of great importance that paddy cultivators should be given facilities for exchange of seed and for the purchase of fresh seed from other districts than their own, as well as for procuring new varieties of seed which might with advantage be introduced into the Island from abroad. There are varieties of paddy not to be obtained in Ceylon which, owing to their possessing special characters suited to the special conditions which obtain in particular districts, can be introduced into the Island to the benefit of cultivators. In introducing such new varieties it might be arranged that before distributing the seed (which as imported would be a comparatively small quantity) among growers, a crop should be raised under the auspices of the Government Agents. Indeed, any measure directed towards the improvement of native agriculture must largely depend for its success upon the help and co-operation of the Revenue Officers. Seeds of other desirable grain or food crops and seeds and plants of fruit trees suitable for cultivation here should be procured and kept at the school, and offered for sale at reasonable rates, so that the country may be benefited by the growth of a larger variety, and of improved and new kinds, of food crops and fruit trees. There is much that we can do in this way in improving native agriculture and in encouraging fruit culture in the Island, by giving facilities to would-be growers for procuring seeds and plants which at present they do not know how or where to get. In certain remote parts of the Island such well-known food-supplying trees as the jak and breadfruit are unknown, while arrowroot is unknown in other parts. It will thus be seen that there is a good deal to be done even in helping to spread the cultivation of indigenons and naturalized trees with immense benefit to the poorer classes in remote districts of the Island.

Publications: Advantages of circulating Leaflets.—I would also suggest that pamphlets, bulletins, and leaflets containing information of value to the agriculturist, with reference to methods of cul-

ture, manures, crops, stock, &c., should be published in English, Tamil, and Sinhalese (if possible with illustrations), and circulated free among the agricultural classes with the help of the Revenue Officers. This is a convenient and recognized means of reaching the people which is adopted by Agricultural Departments in India and elsewhere, and from my own experience in the publication of the "Agricultural Magazine" and in the issue of leaflets in the vernacular (now unfortunately abandoned for want of funds) I can state that the means have proved effectual in evoking an intelligent interest in much that should concern the cultivator of the soil.

Students to be taken on Tour.—In order to make the course of training at the school as thorough as possible, I would recommend that the students be taken on tour during one month of the year, so that they may gain practical acquaintance with the cultivation of Ceylon products as carried on a commercial scale. The necessity for supplementing what is at the best a limited knowledge of practical—but more or less experimental—agriculture gained at a college, by the wider and useful experience that would be afforded by such tours, is recognized by the promoters of agricultural education in England and India; and it is a pity that any element should be wanting in the course of training provided at the school which would tend to make that course as complete as it might be, and go to disprove the charge that the students are lacking in practical experience.

The Superintendent of the School to itinerate.—It is very necessary that provision should also be made to enable the Superintendent to itinerate through the Provinces in order to study native agriculture in all its phases, and acquaint himself with the special features which characterize the various forms of cultivation in the Island: to find out the needs of the people, to confer with village authorities, and, where opportunity offers, to advise and instruct with reference to agricultural practice. As the result of these tours the Superintendent should furnish reports to Government. I think it would be an encouragement to the native cultivators to have some one taking an active interest in their work and welfare. I do not mean to insinuate that no such interest is evinced by the Government Agents and Assistant Government Agents. They are no doubt doing all they can in the cause of native agriculture, but the duties of the Superintendent in this connection will be of a special nature. During such tours much can be done in the way of distributing seeds, leaflets, &c. There are whole Provinces—and many districts—that I have not yet had an opportunity of visiting. A practical acquaintance with the methods and forms of culture adopted in different Provinces and districts should place me at a great advantage whenever I am called upon to report and advise in my official capacity (or when privately consulted) on agricultural matters. Some of these tours of inspection might be undertaken during school vacations.

A Clerk to be attached to the School Staff.—I would urge that a clerk, on a salary of say R25 per mensem, be attached to the school, to undertake the comparatively large amount of clerical work and book-keeping which has to be attended to in connection with the School and Dairy Farm, the greater part of which at present falls to the lot of the Superintendent. The appointment of a clerk should relieve me considerably, and by confining me less to my office leave me free to do more work of an important practical nature. I may mention that a properly furnished office room, to which the many business callers at the school could be shown, is a great want.

Expenditure on the School.—There is a general impression abroad that the expenditure on the School of Agriculture is excessive; and in considering the cost of the institution to Government the fact that there is a considerable revenue from the school and the establishment appertaining to it is seldom recognized. The work of an agricultural school or college, if it is to be at all effective, must be based on a comprehensive and complete scheme, and the necessary funds should be available for carrying out the details of such a scheme.

Savings and Estimates.—The following statement shows how Government will practically save a sum of nearly R9,000 from January, 1897:—

By the abolition of agaicultural instructorships, 6 at R528 per annum and 6 at R396 per annum ...	5,544
By raising of the fee for agricultural students from R5 to R10 per mensem (a measure which came into force in January, 1896) the vote for dieting students will be practically saved ...	3,000
By lapse of vote for travelling by Superintendent to inspect the agricultural instructors ...	200
Total ...	8,744

I beg to recommend that part of this saving be utilized for better equipping the school and in giving a more useful and practical turn to the work connected with the agricultural branch of the Department of Public Instruction. The following is an approximate estimate of the cost of carrying out the recommendations made in the above reports:—

Cost of extra hands, 2 at R15 and 2 at R10	600
Cost of laying out and maintaining premises, including cost of implements, manure, fences, cart, bulls, &c. ...	800
Exchange and purchase of seeds and plants, storing, maintaining nurseries, distributing, &c., together with cost of implements for trials and report	800
Cost of printing and circulating leaflets, &c.	400
Vote for itinerating by Superintendent	600
Cost of taking agricultural students on tour	800
Salary of clerk	300
Miscellaneous	700
Total ...	5,040

I have endeavoured to make the estimates as low as possible. Considering the cost of a visit to the Eastern or the Northern Province, the vote for itinerating by the Superintendent is by no means high. The miscellaneous vote would provide for the undertaking of special experiments under ex-

ceptional circumstances, and need not be an annual expenditure. The trial in vine-growing at present going on is such an experiment.

Agricultural Shows.—I would urge upon Government the importance of drawing up a scheme for holding agricultural shows at short intervals at different centres. These shows should be of a purely agricultural character, held mainly in the interests of native agriculture. Such shows are frequently held in India, where it is acknowledged that the native cultivators have derived material benefit from them.

Employment of trained Students.—Whenever possible students who have had a training at the School of Agriculture might be appointed to posts that would bring them in contact with the agricultural classes, particularly where such appointments would give them a certain amount of influence over the people. Of this nature would be the appointments of native writers and other posts in the Revenue Department carrying salaries of less than R600 per annum, as well as of minor forest and irrigation officers and officers appointed for special agricultural and veterinary work.

Further development of the School.—I have thought that with the help and through the influence of the Revenue Officers it would be possible to arrange for a curriculum for vernacular students (to be nominated by the Revenue Officers) drawn from the classes to which the rural native officials belong, with a view to giving an agricultural training, lasting for one or two years, to those who would be eventually employed as police officers, peace officers, vel-vidanas, fiscals' arachchies, division officers, constable arachchies, &c.

Special provision might also be made at the school for the sons of wealthier landowners who may desire to avail themselves of a course of agricultural training. For such somewhat better arrangements as regards accommodation and diet might be provided on their paying a higher rate of boarding fee. It would be an advantage if surveying could be added to the subjects in the agricultural course, by arrangement, with the teacher of surveying in the Forestry School.

I would again emphasize the importance of providing for a practical veterinary training for the students.

In case the recommendations referring to changes in the school are approved of, I shall be prepared to revise the present printed syllabus and bring it up to date for re-publication.

In conclusion, I may state that some of the suggestions embodied in this report have been put forward by me from time to time in my annual reports, in reports read at public prize givings, and in my official correspondence. A want of funds and other causes would seem to have stood in the way of any such suggestions being adopted. I would earnestly press upon Government (1) the necessity for adopting some definite scheme for agricultural work in connection with the Educational Department ; and (2) of providing the funds necessary for satisfactorily carrying out all the details involved in such a scheme. With these provided, there will be an opportunity of doing really useful work.

A.—Return of Government Dairy Stock for the Year 1896.

Cattle.	Balance on hand on December 31, 1895.	Purchased during the Year.	Born during the Year.	Total.	Died during the Year.	Sold during the Year.	No. to be struck of the List.	Balance on hand on December 31, 1896.
Cows	74	18	—	92	5	22	27	65
Calves ..	65	—	52	117	31	25	59	58
Stud bulls ..	2	—	—	2	—	—	—	2
Draught bulls ..	2	—	—	2	—	—	—	2

B.—Statement Showing Supply of Milk During 1896.

Month.	Supply. Bottles.	Month.	Supply. Bottles.
January	8,779¾	September	8,855½
February	7,819	October	8,875
March	7,552	November	9,041½
April	7,495	December	9,273½
May	8,116		
June	7,713¾		
July	8,187¾	Total ...	100,491
August	8,762½		

Of these 100,491 bottles, 25,692½ bottles had to be purchased from outside sources. Total output of milk at the dairy = 74,798½ bottles of 26 oz., or nearly 12,500 gallons.

C.—FINANCIAL STATEMENT OF THE GOVERNMENT DAIRY FOR THE YEAR 1896.

	Receipts.	Amount. Rs. c.
January ...	Realized by sale of milk, manure, &c. ...	1,626 29
February ...	do. ...	1,498 98
March ...	do. ...	1,636 46
April ...	do. ...	1,445 60
May ...	do. ...	1,558 88
June ...	do. ...	1,482 9
July ...	do. ...	1,569 39
August ...	do. ...	1,674 32
September ...	do. ...	1,688 27
October ...	do. ...	1,694 56
November...	do. ...	1,723 43
December...	do. ...	1,772 33
	For services of stud bull ...	77 50
	For extra milk delivery ...	5 85
	Total ...	19,453 95

Expenditure.	Amount. Rs. c.
Paid to the Maanger as salary during the year	465 00
Paid to coolies	1,390 00
Expended in transporting milk ...	179 85
Expended in feeding cattle during the year	9,246 50
Paid as rent of the Havelock Race-course	180 00
Expended for medicines	27 20
Expended in the purchase of utensils...	23 65
Expended for repars to water service, buildings, and utensils ...	314 66
Expended in purchase of milk ...	4,624 65
Credit balance (profit)*	3,011 44
Total ...	19,453 95

* The Manager of the Dairy is allowed a commission of 6 per cent on this sum.

D.—FINANCIAL STATEMENT OF THE DAIRY FARM, INCLUDING THE GOVERNMENT DAIRY, DAIRY GRASS LANDS, AND MODEL FARM, FOR THE YEAR 1896.

1896.		Rs. c.
Dec. 31	To purchase of stock in 1896	2,510 00
	To amount paid to the Treasurer ...	2,087 55
	To amount of commission paid to Manager for 1896: 6 per cent. commission on Rs. 3,011·44...	180 68
	To balance cash in hand...	4,964 84
	Total ...	9,743 7

1895.		Rs. c.
Dec. 31	By Balance at credit Dairy Farm, 1895 ...	2,984 75
1896.		
Dec. 31	By net profit working the Government Dairy, 1896...	3,011 44
	By net profit working the grass lands, 1696 ...	776 00
	By net profit working the Model Farm, 1896 ...	1,666 6
	By sale of stock, 1896 ...	1,257 6
	By interest allowed by Bank	47 76
	Total ...	9,743 7

E.—STATEMENT SHOWING FINANCIAL POSITION OF THE DAIRY FARM IN ITS RELATION TO GOVERNMENT.

		Rs. c.
1893	To vote from Government...	19,539 12
1894	To special advance, 1894 ...	11,500 00
	Total ...	31,039 12

		Rs. c.
1893	By amount paid to revenue ..	7,627 86
1894	By amount paid to revenue ...	1,262 65
1895	By amount paid to revenue ...	5,237 35
1896	By amount paid to revenue ...	2,087 55
	By balance to be paid to the revenue ...	14,823 71
	Total ...	31,039 12

F.—ASSETS AND LIABILITIES OF THE DAIRY FARM.

1896.	*Liabilities.*	Rs. c.
Dec. 31	To amount due Government, balance as per account...	14,823 71
	To assets over liabilities ...	3,641 13
	Total ...	18,464 84

1896.	*Assets.*	Rs. c.
Dec. 31	By cash in hand ...	4,964 84
	By value of stock, buildings, and utensils ...	13,500 00
	Total ...	18,464 84